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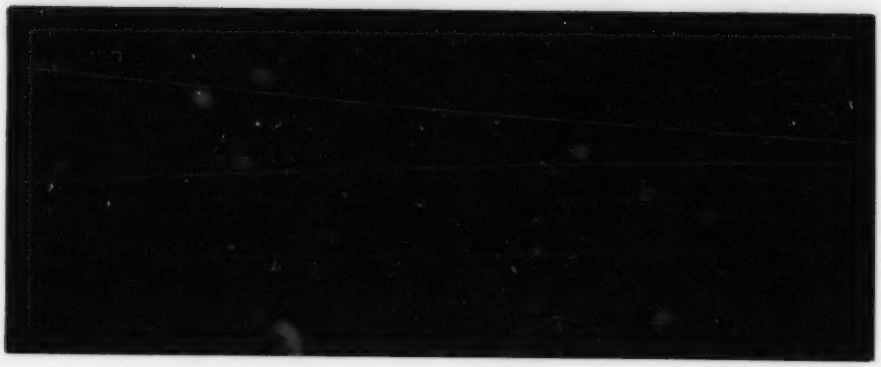

Potential for Saskatchewan Seed Potato Exports to the Northwest United States

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Abstract

Recent work at the University of Saskatchewan indicates that northern grown Saskatchewan seed potato has more vigor and yield than seed grown in the USA. This study assessed the market potential and factors necessary to penetrate the Pacific Northwest (PNW) seed potato market.

The marketing season for seed potatoes is short and the availability of backhaul trucks necessary for low cost transportation limit the market potential. Potato growers in the PNW will pay a premium for high quality seed which may have high vigor or produce greater yield.

To penetrate this market, Saskatchewan must have a superior product with a distinct identity. The study puts forward several recommendations which include conducting further research to confirm the added vigor and higheryield of Saskatchewn grown seed over USA seed. Furthermore, Saskatchewan should have its own seed program to provide a distinct identity.

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SUMMARY

1. Potential for Saskatchewan Seed Potato Exports to Northwest USA

Saskatchewan's present small production of seed potatoes is geared to local commercial growers supplying the domestic table market. Norland and Red Pontiac account for about 85% of the seed production but there has been some experience with varieties required in the Northwest USA, such as Russet Burbank, Kennebec, Norchip and Shepody. Saskatchewan does not have its own seed potato program but brings in Elite 2 and 3 seed, primarily from the Espo Seed Farm in Manitoba and increase these to Foundation and Certified seed. Saskatchewan's low commercial production of potatoes does have the advantage of providing excellent isolation for seed production and the northern geographic location may also be a plus. Recent work at the Department of Horticulture, University of Saskatchewan indicated much more vigor and yield for Saskatchewan grown seed than seed grown in the USA.

Transportation costs are a major factor in accessing the Northwest USA markets and advantage must be taken of back-haul rates. These are reported to be $3.25 to $3.33 Can/cwt or about $2.45 US/cwt for Saskatoon to Pasco, Washington. This is about $0.50 US/cwt higher than rates reported from Edmonton or Manhattan, Montana to Pasco. The volume of back-haul trucking from Saskatchewan is estimated to be about 30% of that from Alberta with the latter indicating 600 loads as being about the maximum they can obtain for seed potato exports. This indicates Saskatchewan should be able to obtain about 180 loads or 81,000 cwt of back-haul trucking. This amounts to approximately 3,700 tonnes or $600,000 in sales per year.

Although 1987 is proving to be a difficult year for the Washington seed potato market, in the longer term Washington offers the best potential market. About 90% of its 2 to 2.5 million cwt annual seed requirements are imported and with the highest average yield in North

SUMMARY (continued)

America there is a willingness to pay premium for high quality seed. There is also a well-developed system of broker/cutters that facilitates a new supplier entering the market on a small scale and expanding as seed quality and reliability of supply are established. The 1986 prices for seed were $7.50 to $8.00 US/cwt FOB Montana growers but the 1987 prices are expected to drop to about $6.00 US/cwt. If we see $7.00 US/cwt as a reasonable figure for the immediate future, then the return to the Saskatchewan grower for the same "laid-in" price as the Montana would be $6.14 US/cwt or $8.10 Can/cwt. This is allowing an extra $0.44 US/cwt for transportation from Saskatchewan over that for Montana and a $0.42 US/cwt for tariff and brokerage fees at the border.

Oregon with about 50% of its 900,000 cwt its annual seed requirements imported is also an attractive market. Prices for Montana seed in Oregon are similar to those in Washington. Although greater distances to the Klamath Basin in Oregon mean increased transport costs from Saskatchewan the same is true for Montana and the competitive position remains similar to the market in Washington. Oregon does not have the same system of broker/cutters as Washington and this market might best be developed after initial establishment of a Washington market.

In spite of its tremendous potato production, Idaho is not as an attractive market because it is largely self sufficient in seed and is a major seed exporter. Its average yield of commercial potatoes is only about 60% of that of Washington and Oregon so they are less willing to pay a premium for high quality. In addition, a very competitive market among domestic seed producers keeps prices substantially lower than in Washington and Oregon.

Although not part of the terms of reference for this study, California is another attractive market. With both a spring and fall

SUMMARY (continued)

crop, there is an annual seed requirement of about 700,000 cwt with about 80% of this being imported. The varieties are quite different from those in the Northwest but a number of them such as Centennial Russet, Kennebec and Yukon Gold can be grown in Saskatchewan. The large amount of back-haul trucking originating from the Bakersfield area make this a market that warrants further investigation.

2. Factors Necessary to Penetrate the Northwest USA Markets

This is a market already well supplied by a variety of growers, all determined to keep their market share. What is needed is a superior product with a distinct identity for which a market is gradually built up on the basis of reliability of supply and performance in the field. If Saskatchewan seed potato growers are going to enter the Northwest USA market, Saskatchewan must have its own seed potato program. This could take many forms, from a full Provincial seed farm with its own meristem culture facilities to individual growers importing nuclear mini-tubers to produce their own Elite stocks and all combinations inbetween. A separate study is required to determine the most appropriate program for Saskatchewan.

There is a pressing need to confirm the added vigor and higher yield of Saskatchewan grown seed over USA seed as indicated in work at the University of Saskatchewan. If it can be clearly demonstrated that Saskatchewan's northern location gives substantially superior seed it will provide for much easier entry into the Northwest USA market and provide the basis for a price premium for Saskatchewan seed.

An umbrella sales agency for Saskatchewan seed growers would not only avoid much duplication of effort but would allow more effective promotion, exert a certain amount of control over quality and spread cash flow problems over a wider base. Part of the necessary marketing and

SUMMARY (continued)

promotion would be entering a seed lot in the annual testing in Washington and Oregon. Additional promotion in the form of advertisements in trade journals, missions of growers and brokers to and from the market area, maintaining a presence at Potato Conferences, etc. will be required. With the very small base of seed potato growers in Saskatchewan much of this promotion will have to be funded, at least initially, by Government.

CONCLUSIONS

1. The Pacific North USA seed potato market is already well supplied by growers who are determined to keep their market share. For Saskatchewan to penetrate this market, the provincial industry must have an superior product with a distinct identity. The market must be built gradually based on reliability of supply and performance in the field.

2. A superior product may be possible if it can be clearly demonstrated that Saskatchewan's northern location gives substantially superior results over USA seed. There is a pressing need to confirm the added vigor and higher yield of Saskatchewan grown seed over USA seed as indicated in work at the University of Saskatchewan.

3. To conclusively prove a superior product to potential buyers, yield test must be conducted in the Pacific Northwest using the seed potatoes grown in northern and southern locations which are produced from the same nuclear material.

4. To achieve a distinct identity, the province must have its own seed potato program. This could take many forms ranging from a full provincial seed farm with its own meristem culture facilities to individual growers who import nuclear mini-tubers to produce their own Elite stocks. Further investigation is required to determine the most appropriate program for Saskatchewan.

5. Much of Alberta's success in exporting seed potatoes is due to the Edmonton Potato Growers (1971) Ltd. which performs the function of an umbrella sales agency.

6. To be competitive in the PNW, back-haul trucking is necessary. However, the availability of back-hauls will limit the size of the potential market in Washington and Oregon to 3,500 tonnes or

CONCLUSIONS (continued)

$600,000 per year. If this potential could be achieved, it would double the size of Saskatchewan's current level of seed potato production.

7. Since backhaul delivery systems are available to California and many other US locations, the potential for export sales would be greater than Washington and Oregon markets if northern vigor could be clearly established. Based on USA fruit and vegetable unloads in Saskatchewan during the marketing season, the maximum theoretical potential is limited to approximately 10,850 tonnes or $1,757,000 per year.

RECOMMENDATIONS

1. If the Saskatchewan seed potato industry wants to enter the seed potato export market, it must prove to potential buyers that Saskatchewan seed is superior to USA seed. Therefore, we recommend that immediate funding be sought by the Horticulture Department, University of Saskatchewan to support research to confirm its preliminary findings of increased vigor and yield in Saskatchewan grown seed potatoes compared to USA produced seed. A carefully designed program will be required to distinguish benefits of Saskatchewan's northern location from other factors affecting vigor and yield and a collaborative program with researchers at Washington State and Oregon State Universities is recommended.

   Such a program should assess the vigor and yield of Saskatchewan seed relative to Montana seed to determine if Saskatchewan has an advantage over Montana's location.

   This proposal research program would be a major study which may not be expensive to implement. American collaborators would probably cost share the research because of the potential benefits to the American potato industry.

2. We recommend that Saskatchewan develop its own Seed Potato Program. There are many possible variations for such a program and the Saskatchewan Vegetable Growers Association should sponsor a separate study to determine the most appropriate form for Saskatchewan. The program should take advantage of the most recent developments in tissue culture techniques to provide high quality seed and to allow for the supply of earlier generation material as the market moves in this direction.

3. We also recommend that consideration be given by Saskatchewan seed potato growers to establishing an umbrella sales agency to facilitate exports sales to the USA.

RECOMMENDATIONS (continued)

4. Furthermore, every effort be made on the part of the potato growers and the Provincial Government to attract potato processing industry to the Province to expand the local market for seed potatoes.

5. We also recommend that the Provincial Government be prepared to provide funding for the promotion of Saskatchewan seed potatoes in USA markets if development of this market begins.

1. Introduction

Looking back 60 years, the production figures for potatoes in Canada in 1925 are given in Table 1. At that time, Saskatchewan was growing more potatoes than Manitoba, Alberta or British Columbia and accounted for 6.3% of total Canadian acreage. In 1985, the picture is very different as shown in Table 2. Saskatchewan has become a very minor player with only 0.9% of the total Canadian acreage and well behind the other Western provinces in potato production. This low level of production is reflected in seed potato production since Saskatchewan has not been an exporter of seed potatoes in recent times. Manitoba has been a sporadic exporter of seed to the USA, peaking with 51,000 cwt in 1981 but due to drought there have been years when they have shipped none. British Columbia has been a steady exporter varying from 10,000 to 40,000 cwt from 1977 to 1984. Alberta has been the most active exporter and is now only second to New Brunswick in terms of Canadian Provinces exporting to the USA. This is reflected in the growth of the Alberta seed potato industry relative to the Saskatchewan industry in the last decade as given in Table 3. The number of Saskatchewan growers has remained steady and acreage has increased by about 300; whereas the number of Alberta growers has doubled and acreage increased by 3000. This Alberta expansion has been mainly in the last five years and largely due to the development of its substantial export trade to the Northwest USA and in particular to Washington.

The present study was therefore undertaken on behalf of the Saskatchewan Vegetable Growers Association to assess the potential for Saskatchewan seed potato exports to the Northwest USA, Idaho, Oregon and Washington. The study has four main themes, a review of the Alberta seed potato industry, an examination of the Northwest USA markets, a determination of the potential for Saskatchewan seed potatoes in these markets and establishing the factors necessary to penetrate these markets.

Table 1

Production of Potatoes in Canada in 1925

	Acres	Yield cwt/acre	Production 000's cwt
P.E.I.	34,100	113	3,853
N.S.	27,900	92	2,567
N.B.	40,000	106	4,240
Que.	156,000	70	10,920
Ont.	163,800	58	9,500
Man.	28,100	85	2,389
Sask.	32,800	84	2,755
Alta.	21,900	98	2,146
B.C.	17,800	105	1,869
Total/Ave.	522,400	90	40,239

Source: Fraser's Potato Newsletter, December 23, 1985

Table 2

Production of Potatoes in Canada in 1985

	Acres	Yield cwt/acre	Production 000's cwt
P.E.I.	73,400	240	17,616
N.S.	4,200	190	798
N.B.	55,000	280	15,400
Que.	47,900	212	10,141
Ont.	37,500	215	8,069
Man.	39,500	190	7,505
Sask.	2,600	230	598
Alta.	20,000	230	4,600
B.C.	9,100	240	2,184
Total/Ave.	289,200	231	66,911

Source: Fraser's Potato Newsletter, September 27, 1986

Table 3

Seed Potato Industry in Saskatchewan and Alberta from 1976 to 1986

	Sask. (1)		Alta. (2)	
	Number of Growers	Acres Seeded	Number of Growers	Acres Seeded
1976	11	150	18	1,285
1977	9	146	16	1,413
1978	12	143	14	1,438
1979	11	170	17	1,273
1980	9	200	16	1,399
1981	9	308	19	1,562
1982	11	378	19	1,921
1983	14	399	24	2,731
1984	13	428	31	3,507
1985	10	512	37	4,400
1986	12	468	37	4,427

Sources: (1) Food Production and Inspection Branch, Agriculture Canada, Regina

(2) Food Production and Inspection Branch, Agriculture Canada, Edmonton

2. Alberta Seed Potato Industry

2.1 Background

Table 4 reviews seed potato production in Alberta since 1970. There was a marked decline in the number of growers, hectares passed and production from 1970 to 1979 with an equally marked resurgence since 1979. The drastic drop in per cent hectares passed in 1976 was the result of a severe contamination of elite seed with bacterial ring rot in the previous year. Production recovered in 1977 but another two years were required to reach the 1975 level of exports to the USA. Since 1979 exports to the USA have climbed steadily as a result of aggressive marketing into the Washington-Oregon area.

Seed potatoes not going to USA exports go primarily to Alberta commercial growers who have been harvesting about 8,000 hectares annually for the past 3 years. Small amounts of seed are also marketed in the other Western provinces and a certain amount also goes to the commercial market because of price variations or cash flow considerations. The Alberta commercial growers have a domestic processing market, as well as a table market, with two chip operations, Hostess and Old Dutch, one french fry plant, York Farms, and a granule processor, Vauxhall Foods. Depending on production and prices some Alberta potatoes also move to Manitoba processors such as Carnation and McCains. This market for process potatoes is reflected in the varieties grown. Table 5 gives the production of Alberta seed potatoes in 1986 by variety and by grade. Russet Burbank alone represents 75% of the total with Norchip, Norgold Russet and Shepody accounting for a further 17%.

2.2 The Alberta Seed Potato Program

The Alberta seed program was established in 1970 to remove the virus X from seed potatoes grown in the province, but has since developed into a progam aimed at all potato diseases. The program operates out of the

TABLE 4
POTATO CERTIFICATION - ALBERTA

Year	Appl's	Fields	Hectares Entered	Hectares Passed	% Passed	Production (Tonnes)	Exported to USA (Tonnes)
1970	46	231	1,800	1,202	66	26,370	585.45
1971	45	288	1,514	1,216	80	18,031	183.15
1972	32	225	975	943	97	15,443	172.35
1973	26	182	805	672	84	13,047	1,513.13
1974	23	165	677	669	99	12,705	1,380.47
1975	24	99	777	620	79	11,984	2,178.72
1976	18	131	520	222	43	4,639	-
1977	16	160	572	512	89	17,305	192.65
1978	14	220	582	558	96	13,268	637.9
1979	17	220	515	473.65	91.9	10,019	444.3
1980	16	255	566.17	483.0	85.3	16,272	3,319.6
1981	19	271	632.5	606.5	96	14,226	3,286.5
1982	19	192	777.4	711.0	91.4	17,699	4,249.0
1983	24	271	1,105.25	971.93	87.9	23,443	6,227.45
1984	31	277	1,419.12	1,215.81	85.7	24,982.28	9,513.6
1985	37	330+96 ASPP Plots	1,780.48	1,697.14	95.3	39,335.3	10,488.89
1986	37	450	1,791.59	1,624.07	90.6	41,117.20	

Source: Food Production and Inspection Branch, Agriculture Canada, Edmonton

Table 5

Alberta Seed Potato Production
1986 Crop in Tonnes

VARIETY	ELITE I	ELITE 2	ELITE 3	FOUNDATION	CERTIFIED	TOTAL
Atlantic	2.08	10.79	63.5	63.0	154.22	293
Bintje	-	9.0	-	-	45.36	54
Caribe	-	-	-	-	0.68	0.68
Carlton	0.68	8.24	62.55	-	64.94	136
Cherokee	-	-	-	-	0.16	0.16
Chieftain	-	-	-	-	0.68	0
Conestoga	8.07	8.96	-	-	17.92	34
Jemseg	-	1.41	-	0.07	0.99	2.47
Kennebec	0.14	9.0	1.8	0.07	103.5	114
Lemhi Russet	2.03	1.35	50.4	-	99.0	152.78
Norchip	27.47	52.29	233.26	-	2924.92	3237
Norgold Russet	10.31	77.79	41.4	850.16	1488.6	2468
Norland	3.83	43.67	225.0	594.0	807.4	1673.9
Red Pontiac	0.09	1.44	-	-	112.5	114
Rideau	-	-	-	0.07	0.68	0.7
Russet Burbank	49.63	246.06	2758.88	11,712.94	15,864.42	30,631
Sangre	6.91	0.14	99.0	40.0	41.0	187
Shepody	1.44	7.68	45.0	-	1401.81	1455.93
Superior	4.84	22.41	-	-	103.08	130
Urgenta	-	-	-	-	0.31	0
Viking	0.31	0.41	2.62	5.48	27.0	35.82
Warba	0.09	9.9	-	9.0	58.5	77
Yukon Gold	3.42	10.37	92.84	-	206.24	312.87
TOTAL	121.34	520.91	3,676.25	13,274.79	23,523.91	41,117

Source: Food Production and Inspection Branch, Agriculture Canada, Edmonton.

Regional Crops Laboratory in Olds, Alberta with greenhouse space and seed increase plots located at the Olds College. Disease-free nuclear and pre-elite stock is produced at this facility. Selected tubers, tested for freedom from Potato Spindle Tuber Virus, are sprouted and when the sprouts are 4 to 5 inches long they are placed in a growth chamber at 100°F for six weeks. At this temperature, viruses are immobilized but the sprout continues to grow so that the new growth is virus-free. The extreme growing tip, the meristem, is removed under a microscope and placed in a tissue culture jar containing liquid nutrient. When the meristem tissue has developed into a plantlet it is tranferred to a petri dish for multiplication. Every 3 to 4 weeks the plantlets are cut into nodal segments and transferred to new petri dishes with agar nutrient. When sufficient plantlets have been developed, they are rooted into sterile soil and grown to maturity in the greenhouse. These greenhouse tubers are nuclear grade stock and are increased one more time in field plots to give pre-elite tubers. All plants in the greenhouse and field plots are tested for Potato Virus X, Potato Virus S, Potato Leaf Roll Virus and Potato Spindle Tuber Virus, and the tubers tested for Bacterial Ring Rot.

In the spring of 1986, 47,000 pre-elite tubers were distributed to approved elite growers in Alberta for multiplication through the Elite 1, 2 and 3 grades and on to Foundation and Certified seed. The number of tubers for each variety is given in Table 6. The cost to the grower was $0.50 per tuber but the estimated cost of production was about $4.00 per tuber or a $200,000 annual budget for the Olds operation. This is made up of $120,000 annually to the Olds College for greenhouse facilities and field plots, including services, maintenance and field equipment, $5,000 to $6,000 for tissue culture supplies and the balance salaries to one professional, one technician and two summer employees.

Inspection and certification of seed potatoes is carried out by Agriculture Canada, Food Production and Inspection Branch under the Seeds Act. The section of the Seeds Regulations dealing with seed potatoes is

Table 6

Alberta Seed Potato Program
Pre-elite Seed Potato Production 1986

Cultivar	No. of Tubers
Atlantic	1,000
Carlton	600
Conestoga	2,000
F72004	100
Kennebec	250
NDA 8694-3	150
Norgold Russet	5,800
Norland	3,000
Norchip	11,000
Russet Burbank	24,000
Red Pontiac	300
Sangre	3,300
Shepody	800
Superior	2,400
Viking	250
Warba	400
Wisc 848	50
Yukon Gold	1,600

Source: Regional Crops Laboratory, Alberta Agriculture, Olds

given in Appendix A and may be briefly summarized as follows. Pre-elite and Elite 1 seed must be planted 100% in tuber units to be sure that all plants from an infected tuber can be rogued even if only one plant shows disease symptoms. Elite 2 seed must be planted 10% as tuber units. This 10% is often planted as whole seed and is used as an indication of disease that be present in the mass planted portion. There is no requirement for tuber unit planting of Elite 3 or Foundation seed. All Elite seed receives 3 inspections with Pre-Elite, Elite 1 and Elite 2 having zero tolerance for disease and varietal mixture on the third inspection. Elite 3 must show no Spindle Tuber Virus, Witches Broom, Bacterial Ring Rot or Varietal Mixture on third inspection and no more than a 0.25% total Blackleg, Wilts and Viruses infection. Foundation and Certified seed receives 2 inspections with disease tolerance for Foundation on the second inspection being the same as for Elite 3 on third inspection. For Certified seed on second inspection, there is still zero tolerance for Spindle Tuber Virus, Witches Broom and Bacterial Ring Rot but the total allowable infection of Blackleg, Wilts and Viruses is raised to 2.0% and 0.1% Varietal Mixture is allowed.

Under the Alberta system, with multiplication of Elite material by approved individual growers, there is little incentive to produce Elite 2 and Elite 3 stocks beyond their own requirements. It is therefore difficult for new growers to enter the market by increasing Elite 3 material to Foundation and Certified seed. Nor is it possible for them to start with Pre-Elite tubers to produce their own Elite 3 material since approval as an Elite grower depends on previous experience as a seed grower. As a result some Elite 3 material comes into the Province from areas such as British Columbia's Pemberton Valley.

At the 1986 meeting of the Alberta Seed Potato Growers Association, a resolution was passed that could alter the Alberta system. It recommended the establishment of a Provincial Seed Farm at a more isolated location than the Olds College. There was concern that greenhouses and other crops in the Olds area could result in infection of

seed potato by transmitters such as the green peach aphid. No decision has as yet been made to act on this resolution, although a request has been made to the Provincial Government for a $500,000 one time capital grant plus an annual operating grant.

2.3 Alberta Production Costs and Returns

The Production Economics Branch of the Economic Services Division of Alberta Agriculture has estimated the cost and returns for commercial and seed potato production in 1980 and again in 1981. The detailed breakdown of these costs and returns is given in Appendix B. A summary of these figures is given in Table 7. The major components of the total operating costs are material costs, including fertilizer, chemicals and seed, hired labor and machinery cost, including fuel, repairs and depreciation. Seed and fertilizer costs were considerably higher for seed potatoes compared to commercial potatoes in 1980 but only marginally so in 1981. Total production costs for seed potatoes average $275 per acre more than for commercial potatoes in these two years. Table 7 illustrates the vacillations that occur in potato production. It indicates that commercial potatoes were much more profitable than seed potatoes in 1980 with the reverse true in 1981. The drop in yield in 1981 reduced the return on seed potatoes and combined with a low price pushed commercial potato production into a deficit position. The price spread between seed and commercial potatoes also varied widely from $5.67 per tonne in 1980 to $55.52 per tonne in 1981. The figures in Table 7 also illustrate the difficulties in trying to arrive at reliable average estimates of the costs and returns for the production of crops such as potatoes.

2.4 Alberta's Marketing of Seed Potatoes into Northwest USA

As shown in Table 4 and noted earlier in Section 1.1, there has been a steady increase in seed potato exports to the USA since 1979 which have gone primarily to Washington with smaller amounts to Oregon. There are a number of reasons for Alberta's success in this market. Because Alberta

Table 7

Summary of Costs and Returns for Commercial and Seed Potato Production in Alberta

	Commercial		Seed	
	1980	1981	1980	1981
Number of farms averaged	5	9	4	3
Acreage per farm	102.2	182.9	77.9	80.3
Yield per acre (tonnes)	12.35	10.58	12.0	8.81
Price ($/tonne)	140.71	104.55	146.38	160.07
Total receipts ($/acre)	1739.30	1106.79	1759.30	1514.02
Total operating costs ($/acre)	829.68	869.95	964.46	1113.50
Interest on equity and debt ($/acre)	151.06	269.58	352.35	269.54
Operator's and family labor ($/acre)	82.14	48.87	60.73	42.34
Total production costs ($/acre)	1062.89	1188.42	1377.54	1425.39
Return to management ($/acre)	676.41	-81.63	381.76	88.63

Source: Economic Services Division, Alberta Agriculture, Edmonton
Agdex 821-15 and 821-22

has a domestic market for process potatoes, varieties of seed being grown for the domestic market were the same as those required in the Washington/Oregon market. A breakdown by variety, grade and month of the 1986 exports to the USA are given in Table 8. Just over 80% of these exports were Russet Burbank with 87% of the Russet Burbank's being Foundation or better. Shepody was the second most popular export with Norgold Russet coming third. The shipping season generally runs from mid-February until the end of April. The early shipments of Yukon Gold in November and December were to California where seeding starts much earlier.

As well as having the right varieties for the market, Alberta also had identifiable, high quality seed because of the generation of their own Nuclear and Pre-Elite material at Olds, a core of very experienced growers and a rigorous field inspection system. There was also excellent promotion of Alberta seed potatoes by the Alberta Potato Commission, the Market Development Division of Alberta Agriculture and key growers by maintaining a display booth at both the Oregon and Washington annual potato conferences. Alberta Agriculture has also sponsored missions of growers to and from Washington and Oregon and Alberta Potato Commission fieldmen have arranged and monitored seed lot tests and grower plot tests of Alberta seed potatoes in Washington and Oregon. Ads have been placed in trade journals such as the Potato Grower and Spudman and "thank-you dinners" put on for American customers. The perception that Alberta's northern climate insures hearty vigorous seed is promoted with the often quoted example of a 1983 Washington grower that received $129 more per acre from Alberta seed than from "the competition."

Another major factor in Alberta's success in the Northwest USA market has been Edmonton Potato Growers (1971) Ltd. This is a cooperative sales outlet for 7 seed growers with 1700 acres of production and 7 table potato growers with 2000 acres of production. In addition, their packaging plant handles packaging of other fresh vegetables and fruits on contract to local wholesale and retail produce buyers. Since

Table 8

Alberta Seed Potato Shipments to USA
1986 in Tonnes

MONTH	ATLANTIC	LEMHI RUSSET	NORCHIP		NORGOLD RUSSET	RUSSET BURBANK			SHEPODY	SUPERIOR	YUKON GOLD		TOTAL
	Elite II	Foundation	Elite III	Foundation	Certified	Elite III	Foundation	Certified	Certified	Elite III	Elite II	Foundation	TONNES
November												19.6	19.6
December												18.43	18.43
February					180.28		120.19						300.47
March		121.26		83.78	456.13		2,914.02	159.57	493.60	66.29			4,294.65
April	0.9		21.98	21.27		129.82	4,059.72	1,066.38	301.59		2.43		5,604.09
May									251.65				251.65
TOTAL TONNES	.9	121.26	21.98	105.05	636.41	129.82	7,093.93	1,225.95	1,046.84	66.29	2.43	38.03	10,488.89

Source: Food Production and Inspection Branch,
Agriculture Canada, Edmonton.

its reorganization in 1971, Edmonton Potato Growers has been the major shipper of Alberta seed potatoes to the Northwest USA and presently handles about 80% of these exports. The manager makes a number of trips per year to Washington and Oregon promoting sales, taking orders from USA growers and broker/cutters and collecting payment for previous sales. Last year's travel budget was $24,000. Sales are about equally divided between broker/cutters and individual growers with some USA growers specifying a particular seed grower in Alberta. Edmonton Potato Growers establishes the contracts and arranges shipping. Normally preliminary orders are placed in November and confirmed in January with a downpayment of 20%. Shipment takes place in February, March and April with the buyer invoiced after delivered weight is confirmed. The Alberta seed grower is paid 45 days after invoicing by the Edmonton Potato Growers regardless of whether or not payment has been received from the buyer. In fact payment is often not received until much later with occasionally lawyers required to obtain payment. This cashflow problem is very serious in seed potato marketing but is alleviated somewhat for a cooperative sales organization such as Edmonton Potato Growers by spreading difficult to collect accounts over a broader base.

Since Montana is the major seed potato supplier in both Washington and Oregon, Edmonton Potato Growers awaits the price quotes from this area before establishing its own price. Alberta does not attempt to undercut Montana price but instead strives for a price premium based on a claimed yield advantage of 2 to 3 tons for Alberta seed over the average yield. Prices in USA dollars per hundred weight, FOB Edmonton, reported by Edmonton Potato Growers for the past eight years are given in Table 9. These are gross prices with the price to the grower less by a confidential commission charge. The landed price to the buyer will be greater than that in Table 9 by the transportation cost, tariff at the border and brokerage charges if incurred. Transporation costs are a major factor and to be competitive on a landed price basis Alberta must take advantage of backhaul rates on trucks moving produce from California, Washington and Canada's West Coast. Because of the low

Table 9

Russet Burbank Seed Prices to Washington Oregon Growers FOB Edmonton

Year	Price US$/cwt
1979	3.00
1980	4.05
1981	7.05
1982	7.10
1983	7.30
1984	7.50
1985	7.50
1986	8.00

Source: Edmonton Potato Growers (1971) Ltd.

temperatures at the time shipments must be made, the bulk of the loads are in reefers or heater-vans although some have gone in hopper bottoms when temperatures have been above normal. Backhaul rates from Edmonton to the Columbia basin in Washington are reported to be $1.90 to $2.00 U.S./cwt. It is the availability of backhaul trucking that imposes the major constraint on further expansion of Alberta seed potato export to the Northwest USA. It is estimated that about 600 loads is the maximum that could be regularly recruits in the shipping period to Washington and Oregon. In 1986 505 loads were shipped by 12 growers for a total of 10,451 tonnes during the spring season. Of these 351 were from northern growers, 73 from central growers and 81 southern growers. Scheduling of trucks is also important as many of the growers do not have undercover loading facilities and loading must be done when the weather permits. Unloading at the destination can also be a problem. Although the broker/cutters may have van unloaders, individual growers do not so Edmonton Potato Growers maintains two portable unloaders in Washington for use of their customers.

The present, 1987 shipping season is promising to be a difficult one. Montana had a severe frost in 1985 which resulted in a loss in their market share in Washington and Oregon in 1986. Montana's 1986 crop however was very good and they are determined to regain their market share in 1987. This is expected to result in lower prices, possibly $6.00 US/cwt FOB the seed grower. In addition, Alberta has also had a good 1986 crop which resulted in an estimated 10,000 tonne surplus of seed over anticipated market demand. Three thousand tonnes have been disposed of as commercial material to a Manitoba processor, but the remaining 7,000 tonnes are expected to exert pressure on Alberta prices generally.

3. Northwest USA Markets

3.1 General

The USA market is attractive to Canadian seed potato growers because of its size. USA total production is about 6 times total Canadian potato production. Planted acreages by State for 1983-85 are given in Table 10. Idaho has by far the largest acreage followed by North Dakota and then Washington with Maine in fourth place. However, if we include yield and look at production, the order is quite different as shown in Table 11 for the ten top States in order of production for 1986. The very high yields of Washington and Oregon move them into second and third place respectively and North Dakota and Maine drop to fourth and fifth place respectively. The three Northwest States, Idaho, Washington and Oregon, together represent 54.6% of the total USA production and 46.1% of the total acreage.

3.2 Washington

The acreage, production, price and value of the Washington potato crop over the last 20 years is given in Table 12. Acreage has tripled in this period with a leveling off in the last ten years. The jump in production in 1985 to 62.37 million cwt was 10% greater than the record production in 1984 and grower prices, especially for the fresh market, tumbled. The 1986 crop at 116,000 acres is similar to the 1984 crop but prices have been slow to recover. The breakdown of production by Counties is given in Table 13. The bulk of the potatoes are grown in the Central and East Central regions, i.e. the Columbia River basin. This is a very dry area with all potato production being under irrigation. The four major varieties grown in Washington, as reported by the Agriculture Statistics Board, NASS, USDA, are Russet Burbank 79.1%, Norgold Russet 6.7%, Lemhi Russet 4.1% and Norchip 3.4%.

Table 10

Planted Acreages for USA Fall Potato Crop, 1983-85

State	Planted Area 000's Acres 1983	1984	1985
California	19.0	19.6	20.4
Colorado	47.0	53.5	57.0
Idaho	315.0	330.0	355.0
Maine	95.0	94.0	98.0
Michigan	43.0	45.0	46.0
Minnesota	70.5	77.1	78.5
New York	42.0	40.0	38.0
North Dakota	132.0	136.0	145.0
Oregon	49.2	57.5	61.0
Washington	104.0	116.0	127.0
Wisconsin	63.0	62.0	65.0
Other	94.7	93.3	90.4
Total	1,074.4	1,124.0	1,181.3

Source: Statistical Reporting Service, USDA, Crop Production

Table 11

Ten Top Potato Producing States, 1986

State	Acres 000's	Yield cwt/acre	Production 000's cwt
Idaho	307.5	284	87,150
Washington	116.0	500	58,000
Oregon	51.0	445	22,712
North Dakota	122.0	180	21,960
Maine	84.0	250	21,000
Wisconsin	58.0	355	20,590
Colorado	52.0	325	16,900
Minnesota	70.0	195	13,650
Michigan	33.0	280	9,240
California	18.0	380	6,840
USA Total	1027.5	299	307,548

Source: Fraser's Potato Newsletter, November 14, 1986

Table 12

Washington Potato Production

Crop Year	Acreage		Yield Per Harvested Acre	Production	Season Average Price	Value of Production
	Planted	Harvested				
	Acres		Cwt.	1,000 Cwt.	$/Cwt.	1,000 Dol.
1966	37,000	37,000	380	14,060	1.70	23,902
1967	43,000	43,000	355	15,265	1.44	21,982
1968	41,500	41,500	390	16,185	1.72	27,838
1969	51,000	51,000	430	21,930	1.55	33,992
1970	61,000	61,000	410	25,010	1.51	37,765
1971	58,000	58,000	395	22,910	1.40	32,074
1972	75,000	75,000	418	31,365	2.09	65,553
1973	84,000	82,000	430	35,260	2.90	102,254
1974	100,000	98,000	420	41,160	3.65	150,234
1975	107,000	105,000	460	48,300	3.15	152,145
1976	124,000	124,000	450	55,800	2.50	139,500
1977	110,000	110,000	460	50,600	2.80	141,680
1978	111,000	111,000	455	50,505	2.45	123,737
1979	102,000	102,000	475	48,450	2.55	123,548
1980	87,000	87,000	505	43,935	4.40	193,314
1981	108,000	108,000	490	52,920	3.95	209,034
1982	110,000	110,000	480	52,800	3.75	198,000
1983	104,000	104,000	520	54,080	4.25	229,840
1984	116,000	115,000	495	56,925	5.15	293,164
1985	127,000	126,000	495	62,370	3.30	205,821

Source: Washington Agricultural Statistics, 1985-86.

Table 13

Washington Potato Production by County

County and District	1984				1985			
	Acreage		Yield Per Acre	Production	Acreage		Yield Per Acre	Production
	Planted	Harvested			Planted	Harvested		
	Acres		Cwt.	1,000 Cwt.	Acres		Cwt.	1,000 Cwt.
WEST								
Clark	400	300	290	87	400	350	320	112
Grays Harbor	150	150	260	39	250	250	200	50
Pierce	150	150	260	39	100	100	200	20
Skagit	2,400	2,300	395	908	2,700	2,600	330	858
Whatcom	1,800	1,700	300	510	1,900	1,800	260	468
Other Counties	100	100	300	30	550	500	440	220
Total	5,000	4,700	343	1,613	5,900	5,600	309	1,728
CENTRAL								
Benton	20,200	20,000	495	9,905	22,500	22,300	510	11,373
Kittitas	1,000	1,000	395	395	1,200	1,200	315	378
Klickitat	1,100	1,100	240	264	1,100	1,100	280	308
Yakima	1,400	1,400	380	532	100	100	300	30
Other Counties	100	100	350	35	1,800	1,800	370	666
Total	23,800	23,600	472	11,131	26,700	26,500	481	12,755
NORTHEAST								
Spokane	300	300	300	90	300	300	300	90
Stevens	300	300	300	90	200	200	320	64
Total	600	600	300	180	500	500	308	154
EAST CENTRAL								
Adams	18,200	18,000	515	9,275	20,100	20,000	515	10,300
Franklin	28,500	28,400	515	14,630	31,400	31,200	510	15,912
Grant	34,200	34,000	510	17,345	36,400	36,200	510	18,462
Other Counties	100	100	350	35	200	200	505	101
Total	81,000	80,500	513	41,285	88,100	87,600	511	44,775
SOUTHEAST								
Walla Walla	5,600	5,600	485	2,716	5,800	5,800	510	2,958
Total	5,600	5,600	485	2,716	5,800	5,800	510	2,958
State Total	116,000	115,000	495	56,925	127,000	126,000	495	62,370

Source: Washington Agricultural Statistics, 1985-86.

Washington is a major market for seed potatoes for nearby States and Canadian Provinces because they only produce about 10% of their own seed requirements. Washington seeds potatoes are grown in the Northwest coastal area near Lynden or on dryland farms in Eastern Washington, with 20 growers seeding 1,864.5 acres in 1986. The sources of Washington seed over the past five years is given in Table 14. Canada's share of this market has been growing steadily with seed coming from Alberta and British Columbia. A severe frost in Montana in 1985 reduced their stocks and accounts for the sharp drop in their market share in 1986. Much of the shortfall from Montana was picked up by Canada with lesser amounts by Washington seed growers, North Dakota, and Nebraska. The frost that hurt Montana also caused extensive damage in Idaho and Oregon so they were not in a position to increase shipments to Washington. All three states, Montana, Idaho and Oregon, as well as Alberta and British Columbia, had good seed potato crops in 1986 so that competition in the Washington market is expected to be strong as these suppliers attempt to regain, maintain or expand their market share.

Reliable figures for seed potato prices are somewhat difficult to obtain. Agencies such as the Federal-State Market News Service, that monitor and report prices for many agricultural commodities, do not attempt to provide information on seed potatoes. Price information must therefore be gathered from individual growers and brokers. Fortunately, figures obtained were quite consistent and agreed with those obtained earlier from Edmonton Potato Growers. Since Montana provides 40 to 50% of the seed in Washington, Montana growers set the price in the area. These growers are very well organized as well and maintain a set price among individual growers. Prices in 1984 and 1985 were in the $7.00 US/cwt to $7.50 US/cwt FOB the grower range. With Montana's short crop in 1986, prices jumped to $8.00 US/cwt at the beginning of the season but dropped back to around $7.00 US/cwt near the end of the season when it was realized that sufficient seed was available from other sources.

Table 14

Sources of Washington Seed Potatoes

Source	1982(1) %	1983(1) %	1984(2) %	1985(2) %	1986(2) %
Montana	51.0	55.2	48.9	41.3	29.3
Idaho	19.0	10.5	15.8	19.4	20.1
Washington	8.0	8.0	7.9	9.9	13.4
North Dakota	12.0	11.5	11.4	9.4	11.7
Canada	3.0	5.0	6.4	8.5	15.2
Oregon	5.0	8.6	5.9	8.1	7.6
Nebraska	1.0	1.0	0.9	1.0	1.5
Others	1.0	0.2	2.8	2.4	1.2

Sources: (1) Analysis of the Market Potential for Alberta Seed Potatoes, 1985, Agriculture Canada, Regional Development Branch, Alberta

(2) Washington Agriculture Statistics

As noted earlier, pricing is expected to be very competitive this spring. This situation has been aggravated by the fact that contracts between commercial growers and processors, that are normally signed in November, had still not been signed by early February. Commercial growers are therefore not in a position to make agreements with seed growers and 1987 seeds prices had not been set at that time. It was hoped that a price of $6.00 US/cwt could be maintained.

Prices quoted are for Russet Burbank Foundation seed. It was quite another story on Norgold Russet seed. Problems with hollow heart in the 1985 crop of Norgold's resulted in disastrous prices to the grower, and seed growers holding large stocks of this variety dropped prices. Figures as low as $1.75 US/cwt FOB Nebraska were reported and some not priced at all. "Pay $2.00 in the fall" was the word on those.

As is the custom in seed potato marketing, prices are quoted FOB the growers location. To get a "laid-in" price, transportation costs, and brokerage, cutting and treating cost if applicable, must be added in. For Montana seed into Washington, transportation is usually by self-unloading potato trucks and freight charges quoted were $1.50 US/cwt from Flat Head Lake, Montana to Pasco Washington and $1.85 to $2.00 US/cwt from Manhattan, Montana to Pasco Washington. Because Washington imports such a large proportion of its seed potato requirements, a unique situation has developed in which 40 to 50% of the seed potatoes are handled by brokers. These brokers act as middlemen between the seed potato grower and the commercial grower, arranging contracts, collecting payments and doing the paperwork. They also often have bulk loading and unloading facilities and seed cutting and treating facilities. Brokerage charges vary from $0.50 to $1.00 US/cwt depending on the location of the seed grower relative to the broker, how much promotion must be done for a new client in the market, etc. Charges for cutting and treating are $1.50 US/cwt for treatment with Captan. For more expensive treating agents such as Tops the charge increases accordingly. The laid-in price for Montana seed potatoes in Pasco in 1987 would therefore be between

$9.50 US/cwt and $10.50 US/cwt, assuming a price to the grower of $6.00 US/cwt and that a broker was used and the seed was cut and treated with Captan.

For Canadian seed in Washington, the laid-in price would also have to include the tariff, which is $0.36 US/cwt with a 0.22% of value as a "customs user" duty, and including a customs broker fee brings the total charge to $0.42 to $0.45 US/cwt. There are no other import barriers at present but there is a very strong nationalistic and protectionist mood in the USA. In the case of seed potatoes, this has been aggravated by British Columbia winning two anti-dumping rulings against Washington potatoes in recent years. One broker stated that he would not handle any Canadian seed and expected a move would be made to block all shipments of Canadian seed potatoes to Washington. Other brokers, less anxious to block Canadian seed, conclude that such a move is possible.

Another factor noted in the Washington market was a move to earlier generation material by the commercial grower. The move from Certified seed to Foundation seed because of lower disease tolerance in the latter, is well along with the bulk of the trade now being in Foundation seed. A further move is now apparent with a demand for Elite 3 seed, not because of lower disease tolerance but because of a preception of greater vigor the closer the seed material is to the tissue culture nuclear stocks. This move is aided by developments in tissue culture techniques which has made greenhouse nuclear mini-tubers cheaper and more readily accessible. For example, "Nu-spuds", Plant Genetics Inc. mini-tubers, are available on short notice at $25 US/lb F.O.B. California with bulk discounts of up to 40% on large orders. The mini-tubers are about 1/2 ounce so a pound is about 32 tubers. One group of growers using Nu-spuds is that in the Shoshone Valley in Northwest Wyoming. They are a new group hoping to market in Washington with Generation 3 and 4 stocks. They are currently only at the Generation 2 level. A company at Manassa, Colorado purchases over 100,000 mini-tubers annually and has been able to multiply stocks at a 12 to 1 ratio annually to provide Generation 2 (Elite 2) seed to other

growers and Generation 3 (Elite 3) to commercial growers. In an article in Food Technology, Addy and Stuart of Plant Genetics Inc. state that their company intends to perfect its production to a point where seed can be delivered to the commercial grower after only one field propagation generation.

3.3 Oregon

Oregon, with 51,000 acres of potatoes in 1986, was below North Dakota, Maine and Minnesota in acreage but its high average yield of 445 cwt/acre placed it in third position in USA production. About 65% of this production was from the Klamath Basin with another 12 from Malheur County. Average yields in Malheur County were considerably lower at 350 cwt per acre than the rest of the state at 460 cwt per acre. Table 15 gives the varietes planted in the eleven major producing states in 1986. Like the rest of the Northwest USA, Russet Burbank at 84.2% was the main variety in Oregon followed by Norgold Russet at 6.6%, Early Gem at 6.1% and Shepody 1.2%.

Oregon is an attractive market for seed potatoes as it only supplies 40 to 50% of its own seed requirements, in spite of the fact that it exports seed to Washington and California. Unfortunately, Oregon does not have the same quarantine system as Washington so that statistics are not available on seed imports. However, the main suppliers are Montana and Idaho with some from British Columbia and recently some from Alberta. Oregon does not have the brokers and commercial cutters that have developed in Washington so that sales are to individual growers. Prices quoted by a grower increased from about $5.00 US/cwt to $7.50 US/cwt over the past five years with an expected drop to about $6.00 US/cwt in 1987. These again were prices for Russet Burbank Foundation seed FOB the grower in Northeast Oregon. The laid-in price for Montana seed in the Klamath Basin would be higher than for Oregon seed because of added transport costs.

3.4 Idaho

The acreage, yield, production, price and value of potato production in Idaho for the past ten years is given in Table 16. Idaho has the largest acreage and production of any state by a wide margin with its

TABLE 15

FALL POTATOES: PERCENT OF MAJOR VARIETIES PLANTED, SELECTED STATES, 1986 CROP

STATE	FIRST		SECOND	
	VARIETY	PERCENT	VARIETY	PERCENT
COLO	CENTENNIAL RUSSET	66.0	RUSSET BURBANK	23.7
IDAHO	RUSSET BURBANK	94.3	NORGOLD	2.1
MAINE	RUSSET BURBANK	27.6	ONTARIO	17.8
MICH	RUSSET BURBANK	32.1	ATLANTIC	16.3
MINN	RUSSET BURBANK	31.4	NORCHIP	24.1
N Y	SUPERIOR	26.0	KATAHDIN	19.4
N DAK	NORCHIP	47.3	RUSSET BURBANK	17.3
OREG	RUSSET BURBANK	84.2	NORGOLD	6.6
PA	KATAHDIN	24.5	NORCHIP	22.5
WASH	RUSSET BURBANK	79.1	NORGOLD	6.7
WIS	RUSSET BURBANK	47.4	NORLAND	10.9
	THIRD		FOURTH	
	VARIETY	PERCENT	VARIETY	PERCENT
COLO	SANGRE	7.2	RED MCCLURE	1.0
IDAHO				
MAINE	SHEPODY	13.8	SUPERIOR	13.6
MICH	ONTARIO	8.4	ONOWAY	7.1
MINN	PONTIAC	11.1	NORLAND	8.9
N Y	MONONA	16.4	HUDSON	6.7
N DAK	NORLAND	11.0	PONTIAC	7.3
OREG	EARLY GEM	6.1	SHEPODY	1.2
PA	ATLANTIC	15.2	SUPERIOR	9.3
WASH	LEMHI RUSSET	4.1	NORCHIP	3.4
WIS	NORGOLD	9.6	SUPERIOR	9.2

Source: Agricultural Statistics Board, NASS, USDA

Table 16

Potato Production in Idaho, 1976-86

Year	Harvested Acres	Yield cwt/acre	Production 000's cwt	Ave. Price $/cwt	Value 000's $
1976	363.0	244	88,455	2.95	260,942
1977	360.0	245	88,200	2.95	260,190
1978	365.0	275	100,310	2.25	225,698
1979	318.0	267	84,930	2.95	250,543
1980	290.0	276	79,910	5.65	451,492
1981	318.0	266	84,480	4.75	401,280
1982	322.0	285	91,785	3.50	321,248
1983	312.0	276	85,990	5.20	447,148
1984	325.0	266	86,600	4.85	420,010
1985	345.0	297	102,515	3.15	322,922
1986	307.0	284	87,150		

Source: Idaho Agricultural Statistics Service

1986 production representing 28% of the total USA crop. The breakdown by Counties of the poduction in 1985 is given in Table 17, which shows the production to run right across the south of the state and up the east side. Looking back to Table 15, it is seen that Russet Burbank completely dominates Idaho production at 94.3% with only another 2.1% of Norgold Russet reported.

With 241 certified seed potato growers with 46,340 acres in 1986, Idaho is virtually self-sufficient in seed supplies and is a major exporter of seed material. What little material that is imported is at the Elite 2 level with the bulk coming from Montana, although some does come from the Pemberton Valley in British Columbia. The bulk of the Idaho seed growers are located in the same Counties as the commercial growers and this plus the large numbers of growers and large acreages makes controlling disease levels in the seed difficult. The Idaho growers are also less well organized than the Montana growers and all of this results in lower prices for Idaho seed. Prices reported for 1986 were $20 US/cwt for Elite 1, $12 US/cwt for Elite 2, $6 to $8 US/cwt for Elite 3 and $5 to $6 US/cwt for Foundation.

3.5 California

Although not part of the Northwest USA and beyond the terms of reference of this report, available information on California is included because it is a potential market and attractive backhaul trucking rates may be available. The statistics on California are somewhat confusing as they have both a spring and fall crop. The figures in the tables in section 3.1 are for the fall crop. In addition, there is a very substantial spring production as shown in Table 17. With the largest acreage and highest yield, California accounts for 40 to 45% of the USA spring crop. Russet Burbank's do not grow well in California so the variety picture given in Table 18 is very different than that in the Northwest USA. Centennial Russets and White Rose are the major varieties

TABLE 17A

POTATOES SELECTED COUNTIES - 1985 CROP

COUNTY AND DISTRICT	ACREAGE		HARVESTED YIELD	TOTAL PRODUCTION
	PLANTED	HARVESTED		
	ACRES		HUNDREDWEIGHT	
NORTH	400	400	288	115,000
SOUTHWEST				
Canyon	10,500	10,000	380	3,800,000
Elmore	12,800	12,600	373	4,700,000
Owyhee	4,100	4,000	370	1,480,000
Other Counties	2,600	2,400	373	895,000
DISTRICT 7	30,000	29,000	375	10,875,000
SOUTHCENTRAL				
Cassia	32,400	31,800	345	10,970,000
Gooding	9,600	9,600	392	3,763,000
Jerome	13,100	12,800	366	4,685,000
Lincoln	3,900	3,800	324	1,231,000
Minidoka	13,000	12,800	343	4,390,000
Twin Falls	10,000	9,700	332	3,220,000
Other Counties	600	600	360	216,000
DISTRICT 8	82,600	81,100	351	28,475,000
EAST				
Bannock	2,600	2,500	310	776,000
Bingham	63,000	61,900	288	17,813,000
Bonneville	38,000	37,400	272	10,173,000
Butte	2,900	2,800	207	580,000
Caribou	5,600	5,500	240	1,320,000
Clark	2,000	1,900	236	448,000
Fremont	34,000	32,300	250	8,075,000
Jefferson	23,000	21,500	260	5,590,000
Madison	37,000	35,800	259	9,272,000
Power	23,000	22,700	299	6,787,000
Teton	10,000	9,500	210	1,996,000
Other Counties	900	700	314	220,000
DISTRICT 9	242,000	234,500	269	63,050,000
STATE	355,000	345,000	297	102,515,000

Source: Idaho Agricultural Statistics Service

Table 17B

USA Spring Crop Potato Production

State	Harvested Acres		Yield cwt/acre		Production 000's cwt	
	1985	1986	1985	1986	1985	1986
Alabama	5,300	4,700	160	130	848	611
Arizona	5,800	6,100	250	270	1,450	1,647
California	27,500	19,500	385	400	10,588	7,800
Florida	27,300	25,400	210	210	6,643	6,314
Louisiana	600	600	70	65	42	39
North Carolina	14,000	13,100	165	160	2,310	2,096
Texas	6,500	6,200	170	180	1,105	1,116
TOTAL/AVE.	87,000	75,600	264	260	22,986	19,623

Source: Fraser's Potato Newsletter, April 14, 1986.

Table 18

California Spring Crop Varieties[1]

Variety	1985 Acres	1986 Acres
White Rose	9,497	7,478
Round Reds	2,592	1,894
Russets (mostly Centennials)	14,572	6,341
Kennebecs	3,680	3,362

1. These figures are for kern County, another 200 to 400 acres are grown outside Kern County.

Source: Fraser's Potato Newsletter, April 14, 1986.

with smaller amounts of Round Red and Kennebecs. An interest in the yellow fleshed Yukon Gold in California was also reported by the Alberta Potato Commission. The Alberta Potato Commission has had test plots at Edison of Alberta Centennial Russet and Yukon Gold seed. Both varieties were reported to fare very well with a yield of 400 cwt per acre for the Centennial Russet and 300 cwt per acre for Yukon Gold.

4. Potential for Saskatchewan Seed Potato Exports to the Northwest USA

4.1 Saskatchewan Seed Potato Production

As noted in the introduction, the number of seed potato growers in Saskatchewan has remained fairly constant over the past ten years, varying from 9 to 14. Production has increased from 150 acres in 1976 to 468 acres in 1986. Without exports this production is for Saskatchewan commercial growers. Since Saskatchewan does not have any potato processing industry, the commercial growers essentially supply the domestic table market which is predominantely for reds. This is reflected in the seed variety acreages for 1985 and 1986 given in Table 19. Norland and Red Pontiac account for about 85% of Saskatchewan seed, but there has been some experience with varieties required in the Northwest USA such as Russet Burbank, Kennebec, Norchip and Shepody.

Saskatchewan does not have its own seed potato program. Seed growers start with Elite 2 or Elite 3 material from out of Province and increase this to Foundation and Certified seed. The total acres passed for inspection in 1985 were Elite 3, 15, Foundation, 87, Certified, 387. The bulk of the Elite material comes from the Espo Seed Farm at Portage la Prairie. This seed farm is operated by the Seed Potato Growers Association of Manitoba with funding by Provincial and Federal Governments, including the Government of Saskatchewan. The Plant Industry Branch of Saskatchewan Agriculture provides $6,500 annually toward operating costs of the production of Elite 1 and Elite 2 seed at the Espo farm. Saskatchewan growers are entitled to order in the same manner as Manitoba growers with future years orders stated clearly. The Elite 2 price is the same for Manitoba and Saskatchewan growers. Since the Manitoba Seed Potato Growers Association assess themselves an acreage fee to subsidize the production of Elite 3, the price to Saskatchewan growers for Elite 3 is $0.015 per lb. above that set for Manitoba growers. If Saskatchewan orders grow beyond 10% of Espo's Elite 2 and 3 production the situation will be reassessed with Manitoba orders given

Table 19

Saskatchewan Seed Potato Varieties

Variety	1985 acres	1986 acres
Norland	403	371
Russet Burbank	56	36
Red Pontiac	14	12
Carlton	9	15
Kennebec	5	1.5
Viking	SP*	1.7
Norchip	2	-
Yukon Gold	0.7	-
Shepody	-	0.7

* Seed Plot

Source: Food Production and Inspection Branch, Agriculture Canada, Edmonton

priority. The Espo Farm does not do its own meristen culture but rather obtains disease-free tubers from Agriculture Canada Plant Virus Laboratory in Vancouver. These tubers are then mulitplied in the greenhouse by stem cutting of mother plants wih the final cuttings going to the field to provide Pre-Elie tubers.

Saskatchewan's low potato production does have the advantage of providing excellent isolation for seed potato production free from disease. The small crop and local seed production has also meant that Saskatchewan seed potato growers have enjoyed some of the highest prices on the North American Continent. Suggested 1986 prices established by the Saskatchewan Vegetable Growers Seed Committee are given in Table 20. Saskatchewan's geogrphic location is also a plus.

It is generally conceded that seed potatoes grown in more northerly locations or at higher altitudes are more vigorous and produce higher yields but there is little data quantifying this effect. Tubers grown in these locations with a short growing season are undoubtedly of a younger physiological age and apical dominance will not have developed. Recent work at the Horticulture Department at the University of Saskatchewan suggested a very marked increase in yield from Saskatchewan grown seed compared to seed produced in the USA. There was also a significant difference in some varieties between seed grown in northern and southern Saskatchewan with the northern material again giving higher yields.

4.2 Transportation to Northwest USA Markets

As noted under Section 1.4 on Alberta's Marketing of Seed Potatoes into Northwest USA, transportation costs are a major factor and to be competitive in laid-in price, advantage must be taken of back-haul rates on trucks moving produce from California, Washington and Canada's West Coast. The preferred route from Saskatchewan to the Moses Lake/Pasco area in Washington is to pick up number 3 highway at Medicine Hat in Alberta through to highway 95 at Cranbrook, British Columbia and down 95

Table 20

Suggested Saskatchewan Seed Potato Grower Prices for 1986

	Foundation		Certified	
Variety	$/75 lbs.	$/cwt Bulk	$/75 lbs.	$/cwt Bulk
Norland	8.50	10.30	8.10	9.80
Pontiac	8.50	10.30	8.10	9.80
Russet Burbank	9.45	11.60	9.05	11.10

Source: Proceedings of Prairie Potato Conference - 1986

to Bonners Ferry, Idaho and Spokane, Washington. Interstate 90 then goes to Moses Lake or 395 to Pasco. The distance from Saskatoon to Pasco is very close to 1100 miles and, at a reported minimum rate of $1.00 US per mile for a reefer or heater-van carrying 45,000 lbs, this comes to $2.44 US/cwt or $3.26 Can/cwt. This is similar to other rates quoted by trucking firms which were $3.25 Can/cwt and $3.33 Can/cwt. This is about $0.50 US/cwt higher than rates reported from Edmonton or from the Manhattan area in Montana to Pasco. It would be a further 350 miles down highway 97 to Klamath Falls Oregon, which using the figure of $1.00 US/mile would amount to an additional $0.78 US/cwt or $1.04 Can/cwt.

For Idaho, the mileage to Idaho Falls from Saskatoon is virtually the same as to Pasco Washington and so the rates would be expected to be the same. These rates reported are for reefers or heater-vans and somewhat lower rates were reported for hopper bottom trucks at $2.97 Can/cwt into Moses Lake, Washington. However, with the low temperature prevalent during the shipping season, hopper bottom's could be risky and could only be utilized during particularly mild periods. All of these back-haul rates are substantially lower than front-haul rates on say apples or onions moving from Washington to Saskatoon. Here, rates of $5.30 Can/cwt to $7.00 Can/cwt were reported.

Estimation of the volume of back-haul trucking available during the shipping season is difficult. Trucking firms expressed the opinion that a "good deal" is available with competing back-haul products being meat, grain and peat-moss but no quantitative figures were available. Probably the best estimate can be obtained by looking at the fresh fruit and vegetable unloads and relating that to Alberta's experience. Table 21 gives the unloadings from British Columbia, Washington and California in Saskatoon, Regina, Edmonton and Calgary for February, March and April 1985. The total unloads in Saskatoon and Regina as a percentage of the unloads in Edmonton and Calgary are 29.2% for February, 30.6% for March and 27.7% for April, i.e., Saskatchewan has about 30% of the back-haul trucking available to Alberta in these months. Alberta has indicated

Table 2I

Fresh Fruit and Vegetable Unloads
in Saskatchewan and Alberta from
Selected Locations - 1985

	February	March	April
		000s lbs	
Saskatoon			
B.C.	688	575	555
Washington	231	400	195
California	2,110	2,417	2,364
Regina			
B.C.	634	691	683
Washington	157	328	82
California	1,898	2,317	2,467
Totals	5,718	6,728	6,346
Edmonton			
B.C.	2,779	2,094	2,072
Washington	1,295	1,634	1,361
California	5,770	8,167	9,267
Calgary			
B.C.	1,920	1,747	1,485
Washington	678	585	597
California	7,165	7,751	2,467
Totals	19,607	21,978	22,922

Source: Annual Unload Report, Fresh Fruit and Vegetables, 1985
Marketing and Economics Branch, Agriculture Canada.

that 600 loads (270,000 cwt) is about the maximum that they can obtain for seed potato exports. This would indicate that Saskatchewan should be able to obtain about 180 loads or 81,000 cwt of back-haul trucking in this period.

Both loading and unloading of reefers and heater-vans can also be a problem. Although most growers have conveying equipment that can be used for loading, only a few have undercover loading facilities. Scheduling back-haul trucking to match weather conditions that allow outdoor loading can be a real problem. At the other end, broker/cutters in Washington generally have van unloaders but few individual growers do. There are some portable unloaders in Washington that can be rented but they are in great demand, especially during the peak of the shipping season.

4.3 Potential Market in Washington

The 1987 marketing season for seed potatoes in Washington is proving to be a difficult one. An oversupply of seed in all the suppliers to the market plus lagging contract agreements between processors and commercial growers and between commercial growers and seed growers means very little interest in the prospect of any new suppliers entering the market and protectionists sentiments mean even less sympathy for a new Canadaian supplier. In the longer term, however, Washington offers the best potential market in the Northwest USA for Saskatchewan seed potatoes. With about 90% of its 2 to 2.5 million cwt annual seed requirements imported it is a very large market. The estimated 81,000 cwt back-haul trucking for Saskatchewan seed potatoes is only 3 to 4% of this market. Having the highest average yield in North America (500 cwt/acre in 1986) there is a willingness to pay a premium for high quality seed. In addition the development of numerous broker/cutters in Washington is a distinct advantage to a new supplier entering the market. They supply a continuing presence in the marketplace with excellent grower contacts that allows a new supplier to start on a relatively small scale and expand as seed quality and reliability of supply are established. They

also provide bulk unloading facilities and custom cutting and treating, which opens the market to the smaller commercial growers in Washington that could not otherwise be served by foreign seed. It is likely, of course, that brokerage fees will be higher ($1.00 US/cwt) for a new supplier than a long established client ($0.50 US/cwt) because of extra travel and promotion costs.

Montana, as the major supplier to the Washington market, tends to set the standards for quality and price of seed. As has been noted earlier, the 1986 price of $8.00 US/cwt FOB the Montana grower were higher than normal and the expected 1987 price of $6.00 US/cwt lower than normal. A price of $7.00 US/cwt would therefore seem reasonable on which to calculate a potential return to Saskatchewan growers if they were to sell at the same laid-in price as Montana growers. The additional costs to the Saskatchewan grower would be tariff at the border, $0.42 US/cwt, and additional transportation costs of $0.44 US/cwt for a total of $0.86 US/cwt. This is taking the lowest reported figure for tariff plus broker's fees at the border, the highest reported freight cost for the Montana grower and no increased brokerage fees for a new supplier. On these assumptions, the return to the Saskatchewan grower would be $6.14 US/cwt or $8.19 Can/cwt, well below present Saskatchewan seed potato prices. This raises the question of whether a premium could be obtained for more vigorous northern grown seed and stresses the need to confirm the preliminary results obtained at the University of Saskatchewan in this regard. Higher returns might also be obtained by marketing Elite 3 rather than Foundation seed.

4.4 Potential Market in Oregon

Oregon is also an attractive market with about half of its 900,000 cwt to 1,000,000 cwt annual seed requirement imported. Prices in Oregon for seed imported from Montana are similar to those in Washington FOB the grower. The greater distance to the Klamath Basin area from Saskatchewan means higher transportation costs but the same is true for seed from Montana, British Columbia and Alberta so the competitive position with

these suppliers is similar to that in Washington. Idaho suppliers with shorter transport distances have an advantage in this market but Idaho seed is generally considered of somewhat lower quality and premiums are paid for Montana or Canadian seed. In both Washington and Oregon an essential part of marketing is entry of seed lots into annual tests at Othello and Herminston respectively. Oregon does not have a system of brokers and cutters developed to the extent that Washington does so that marketing would be to individual growers and might best be developed after initial establishment of a Washington market.

4.5 Potential Market in Idaho

In spite of its tremendous potato production, Idaho is a less attractive market than Washington and Oregon for seed potatoes because they are not only largely self sufficient but are a major exporter of seed. Their average yields are only about 60% of that of Washington and Oregon so there is less willingness to pay a premium for high quality seed. This plus a very competitive market among domestic seed growers keeps prices substantially lower than in Washington and Oregon. Distances from Saskatoon to Idaho Halls is similar to that to Washington markets so that transportation costs would be about the same. Although not an attractive initial market, it should not be ignored in the longer term. There is some imports of early generation material by Idaho growers which could be of interest as Saskatchewan develops its own seed potato program. As well, it may be possible to convince some Idaho growers of the advantages of extra vigor from Saskatchewan seed if indeed that can be well documented.

4.6 Potential Market in California

Although outside the terms of reference of this report, this is another attractive market. With both a spring and fall crop, there is an annual seed requirement of around 700,000 cwt with about 80% of this being imported. There is a good deal of back-haul trucking originating

from the Bakersfield area and rates from Saskatchewan and Alberta are about equal and compare favorably to Montana rates. California plantings start much earlier than in the Northwest USA, running from mid-November through to February and thereby extending the shipping season. This also has its downside, however, as it means loading and shipping during the coldest weather on the Prairies. California varieties are also quite different than in the Northwest but a number of them such as Centennial Russet, Kennebec and Yukon Gold can be grown successfully in Saskatchewan. This is a market that warrants further investigation.

5. Factors Necessary to Penetrate the Northwest USA Markets

5.1 High Quality Seed with Saskatchewan Identity

It goes without saying that the varieties produced must match the demand in the market which in this case is predominately Russet Burbank. The market must also be monitored for shifts in demand such as a drop in demand for Nortold Russet and an increasing demand for Shepody. However, simply growing the right varieties and offering them for sale will not win a place in this market which is already well supplied by a variety of growers, all determined to keep their market share. What is needed is a superior product with a distinct identity for which a market is gradually buit up based on reliability of supply and performance in the field.

If Saskatchewan seed potato growers are going to enter the Northwest USA market, Saskatchewan must have its own seed potato program. This could take many forms, from a full Provincial seed farm with its own meristem culture facilities to individual growers importing nuclear mini-tubers and producing their own Elite material and all combinations in between. Alberta's seed program was outlined in an earlier section and an outline of Montana's seed program and its application by an individual grower are given in Appendix C. It is beyond the scope of this study to evalute the pros and cons of these various alternatives in terms of assurance of quality, selection of particularly vigorous clones,

cost and agency of control. A separate study is required, possibly including European experience, to determine the most appropriate program for Saskatchewan. One criteria that should be included would be the ability to supply earlier generation material as this market develops.

5.2 Confirming Added Vigor in Saskatchewan Grown Seed

Alberta promotes their seed on the basis that their northern climate insures hearty, vigorous seed and that in comparative tests in Washington State, Alberta seed performs better than average. No quantitative data are reported, however, to properly document this claim. Preliminary tests at the University of Saskatchewan have indicated that Saskatchewan grown seed, and particularly that from the more northern growing areas, performed very much better than USA grown seed. If this can be confirmed and be shown conclusively to be due to the northern location it would not only provide for much easier entry into the Northwest USA market but would be the basis for a premium for Saskatchewan seed. Since seed vigor can be affected by many factors such as climatic conditions during the growing season for the seed, seed storage conditions, the number of generations from nuclear stock, different clones from a given variety and any incipient disease level, a carefully planned set of trials will be required to distinguish northern growing location from these other factors. A collaborative program with Washingon and/or Oregon State University researchers might be the most effective.

5.3 An Umbrella Sales Agency for Saskatchewan Seed to the Northwest USA

The Edmonton Potato Growers (1971) Ltd. has been a major factor in Alberta's success in the Washington market and some such umbrella agency would also be required in Saskatchewan. This not only avoids duplication of effort in handling the paperwork, negotiating contracts, arranging shipment and collecting payments but also spreads any cash flow problems over a wider base. A single sales agency also allows for more effective

promotion and can exert a certain amount of control on product quality. Again, a variety of forms are possible but one representing all seed growers would be the most effective.

5.4 Annual Seed Lot Testing in Washington and Oregon

Once a seed potato program has been established for Saskatchewan and material is approaching market generation, seed lot testing in Washington and Oregon is an important part of marketing. These tests are run by the States and as well as monitoring any disease in individual seed lots, field days provide a chance to compare the relative growth of seed from various sources. Row numbers are coded so that only the supplier of the seed knows which is his row unless he wishes to supply the information to prospective buyers. No yield data is collected as it is believed that data from a single seed lot test is meaningless. The Washington test is located at Othello and supervised by Dr. Robert Thornton at Washington State University. For inclusion in the test the sample is to be submitted by a Washington grower or broker. The Oregon test is located Herminston and is supervised by Mr. Luther Fitch, County Extension Officer and seed lots would be accepted directly from Saskatchewan. There is no charge for either test. Single drop seeds of about 4 ounces are needed with sufficient for a 200 ft. row at 9 in spacing. These two sites also provide a separate test for source material that is to be used to produce seed. A further seed lot test is operated by the Washington Potato Commission at Posser which is supervised by Dr. Gene Easton of Washington State University. This test is also open to entries from Canada, with a $50 US charge per seed lot. Regular seed size of 2 to 10 ounce is cut with an aseptic knife. Applications for entry in the test and shipping instructions are obtained from the Washington Potato Commission in Moses Lake. There is some doubt as to whether or not this test will be continued in the future. Alberta has also used grower plots in their promotion. Alberta seed is sown in the same field as a competitors seed and the two compared for vigor and yield. Although useful as a marketing tool it does not provide a sound scientific basis for yield comparisons.

5.5 Strong Promotional Efforts

With a very competitive market like that in the Northwest USA, continuing strong promotional efforts are required to gain and maintain a place in the market. Placing of advertisements in widely read trade journals, maintaining a presence at the annual Oregon and Washington Potato Conferences, sponsoring missions to and from the area for growers and brokers and a good deal of travel by sales representatives are all part of such promotion. With the very small base of seed potato growers in Saskatchewan much of this promotion will have to be funded, at least initially, by Government.

5.6 Establishment of Potato Processing in Saskatchewan

Every effort should be made to attract one or more potato processors to the Province. This would provide a market for the varieties that are required in the Northwest USA, about 80% of Washington's production goes to processing. This in turn would expand seed production in these varieties and provide a domestic base on which to expand. It would also serve to keep both commercial and seed growers abreast of developments in the processing industry and any problems that might also affect seed markets in the USA.

List of Persons and Firms Contacted

Bill Childerhose
Saskatchewan Vegetable Marketing Commission
Outlook, Saskatchewan

Harry Meyers
Saskatchewan Vegetable Growers Association
Outlook, Saskatchewan

Elwyn Vermette
Prairie Dome Potatoes
Yorkton, Saskatchewan

Wilf Walker
Market Development
Alberta Agriculture
Edmonton, Alberta

Gaye Lepage
Food Production and Inspection Branch
Agriculture Canada
Edmonton, Alberta

Bill Devos
Edmonton Potato Growers (1971) Ltd.
Edmonton, Alberta

Jack Klassen
Alberta Potato Commission
Taber, Alberta

Jim Letal
Regional Crops Laboratory
Olds, Alberta

Bob Thornton
Washington State University
Pullman, WA

Gene Easton
Washington State University
Pullman, WA

John Tucker
Three Rivers Potato Services
Pasco, WA

Martin McCullough
Northwest Potato Sales Inc.
Kennewick, WA

Larry Jorgenson
Washington Potato Growers Association
Pasco, WA

Dave Long
Harvest Fresh Produce
Othello, WA

Al Mosley
Oregon State University
Corvallis, Oregon

Oscar Gudbrat
Oregon State University
Corvallis, Oregon

Luther Fitch
County Extension Services
Hermiston, Oregon

Gene Thiel
Potato Grower
Joseph, Oregon

Greg Lowrie
Idaho Crop Improvement Association Inc.
Boice, Idaho

Dick Clarke
Idaho Crop Improvement Association Inc.
Idaho Falls, Idaho

Bob Tratz
Idaho Agriculture Statistics Service
Boise, Idaho

Neil Earhart
Shoshone Seed
Powell, WY

Ace Globe
Federal State Market News Service
Yakima, WA

Cecil Stushnoff
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Saskatoon, Saskatchewan

Laurie Wagner
Martin's Vegetable Sales Ltd.
Saskatoon, Saskatchewan

A-1 Freight and Truck Brokerage Ltd.
Saskatoon, Saskatchewan

Priel Transport Ltd.
Saskatoon, Saskatchewan

Matchett Trucking Co. Ltd.
Saskatoon, Saskatchewan

Sam Jennings
Plant Genetics Inc.
Nampa, Idaho

Leonard Rossnagel
Espo Seed Farm
Portage La Prairie, Manitoba

APPENDIX A

SEEDS ACT

FOOD PRODUCTIO
INSPECTION BRAN
AGRICULTURE CAN
APR - 7 1983
EDMONTON, ALBE

CANADA

OFFICE CONSOLIDATION

CODIFICATION ADMINISTRATIVE

Seeds Act

Loi relative aux semences

R.S., c. S-7
amended by

1976-77, c. 28

S.R., c. S-7
modifiée par

1976-77, c. 28

Seeds Regulations

(PART II)

Règlement sur les semences

(PARTIE II)

C.R.C., c. 1400

C.R.C., c. 1400

February 1980

Février 1980

SEEDS REGULATIONS

PART II

SEED POTATOES

Interpretation

45. (1) In this Part,

"Act" means the *Seeds Act*; (*Loi*)

"certificate" means a certificate that is issued pursuant to subsection 52(1); (*certificat*)

"certificate number", in respect of seed potatoes, means a serial number on a certificate, which number identifies the growing crop of seed potatoes in respect of which the certificate was issued and the tubers produced by the growing crop; (*numéro de certificat*)

"Department" means the Department of Agriculture; (*ministère*)

"Director" means the Director of the Plant Quarantine Division of the Department; (*directeur*)

"field inspection" means an inspection referred to in section 51; (*inspection en culture*)

"grade" means a grade of seed potatoes set out in Schedule IV; (*qualité*)

"growing crop" means a growing crop of seed potatoes; (*culture en croissance*)

"officer in charge" means a person designated as such by the Director; (*chef de service*)

"official tag" means a tag or label issued under the authority of the Minister for the purpose of identifying seed potatoes; (*étiquette officielle*)

"plant indicator host" means any plant that may indicate a virus or other pathogenic infection after inoculation by sap, vector, scion graft or other means from a plant being tested; (*plante-hôte indicatrice*)

"prescribed variety" means a variety of seed potatoes prescribed by the Minister pursuant to subsection 4(2) of the Act; (*variété prescrite*)

"seed potato" means a potato or any part thereof produced, marketed or used for propagation; (*pomme de terre de semence*)

"table stock potato" means a potato or any part thereof produced, marketed or used for consumption; (*pomme de terre de consommation*)

"tuber unit" means one hill of seed potatoes planted with one tuber or two or more hills planted consecutively from setts cut from one tuber. (*tubercule individualisé*)

RÈGLEMENT SUR LES SEMENCES

PARTIE II

POMMES DE TERRE DE SEMENCE

Interprétation

45. (1) Dans la présente partie,

«certificat» désigne un certificat délivré selon le paragraphe 52(1); (*certificate*)

«chef de service» désigne une personne nommée à ce poste par le directeur; (*officer in charge*)

«culture en croissance» désigne une culture de pommes de terre de semence en croissance; (*growing crop*)

«directeur» désigne le directeur de la Division de quarantaine des plantes du ministère; (*Director*)

«étiquette officielle» désigne une étiquette mobile ou fixe délivrée avec l'autorisation du Ministre aux fins d'identifier des pommes de terre de semence; (*official tag*)

«inspection en culture» désigne l'inspection visée à l'article 51; (*field inspection*)

«Loi» désigne la *Loi relative aux semences*; (*Act*)

«ministère» désigne le ministère de l'Agriculture; (*Department*)

«numéro de certificat» pour les pommes de terre de semence désigne le numéro de série apparaissant sur le certificat lequel numéro identifie la culture de pommes de terre de semence en croissance pour laquelle a été délivré le certificat, et les tubercules produits par la culture en croissance; (*certificate number*)

«plante-hôte indicatrice» désigne toute plante qui peut indiquer la présence d'une virose ou d'une autre infection pathogénique après inoculation avec la sève, un vecteur, un greffon ou un autre moyen à partir d'une plante à l'essai; (*plant indicator host*)

«pomme de terre de consommation» désigne un tubercule ou une partie de tubercule de pomme de terre produit, vendu ou utilisé pour la consommation; (*table stock potato*)

«pomme de terre de semence» désigne un tubercule ou une partie de tubercule de pomme de terre produit, vendu ou utilisé pour la multiplication; (*seed potato*)

«qualité» désigne une qualité de pommes de terre de semence visée à l'annexe IV; (*grade*)

«tubercule individualisé» désigne un tubercule de pommes de terre de semence planté dans une butte ou des fragments de plantons d'un même tubercule plantés dans deux ou plusieurs buttes consécutives; (*tuber unit*)

«variété prescrite» désigne une variété de pommes de terre de semence prescrite par le Ministre selon le paragraphe 4(2) de la Loi. (*prescribed variety*)

Application

46. This Part applies to seed potatoes that are sold or advertised for sale in Canada, imported into Canada or exported from Canada.

Grades and Grade Names

47. (1) The grades of seed potatoes are hereby established with the grade names set out in Schedule IV and any seed potatoes that meet the requirements for one of those grades shall be graded accordingly.

(2) The tubers of any seed potatoes that have been graded pursuant to subsection (1) shall be sorted according to size as set out in Schedule V.

Standards

48. The standards set out in Schedule VI are hereby prescribed as the standards for the tubers of seed potatoes.

Application for Crop Inspection

49. (1) Every application for inspection of a growing crop shall be made on a form supplied by the Department and delivered to the office of the Department specified on the form on or before June 16th of the crop year in respect of which the application is made.

(2) Where an application referred to in subsection (1) is made in respect of a growing crop that was planted with seed potatoes not produced by the applicant, the application shall be accompanied by

(*a*) an official tag from one container of each lot of potatoes in the case of potatoes sold in containers;

(*b*) one copy of the permit referred to in paragraph 56(1)(*a*) in the case of potatoes sold in bulk; or

(*c*) a copy of the written permission referred to in paragraph 57(1)(*b*), in the case of potatoes referred to in section 57.

Conditions for Crop Inspection

50. (1) Subject to subsection (3), inspection of a growing crop shall only be made under the following conditions:

(*a*) the crop is planted with seed potatoes that

(i) are of a prescribed variety and

(A) satisfy the requirements for grade Elite I, Elite II, Elite III or Foundation, or

(B) were imported from a state of the United States and were certified by a certification agency of that state as being of a grade that is of the same standard as a grade referred to in clause (A), or

(ii) were produced from a growing crop that had been inspected by an inspector and approved by the officer in charge as a growing crop that would produce seed potatoes of a grade referred to in clause (i)(A); and

Application

46. Cette partie s'applique aux pommes de terre de semence vendues ou annoncées pour la vente au Canada, importées au Canada ou exportées du Canada.

Qualités et noms de qualités

47. (1) Les qualités et les noms de qualité de pommes de terre de semence sont établis selon l'annexe IV, et toute pomme de terre de semence répondant aux exigences d'une de ces qualités doit être classée en conséquence.

(2) Les tubercules de toutes pommes de terre de semence ayant été classées selon le paragraphe (1) doivent être triés d'après le calibrage visé à l'annexe V.

Normes

48. Les normes visées à l'annexe VI sont celles prescrites pour les tubercules de pommes de terre de semence.

Demande d'inspection d'une culture

49. (1) Chaque demande d'inspection d'une culture en croissance est faite sur une formule fournie par le ministère et remise au bureau du ministère y indiqué, le ou avant le 16 juin de la campagne pour laquelle la demande est faite.

(2) Lorsque la demande visée au paragraphe (1) est faite pour une culture en croissance provenant de pommes de terre de semence non produites par le demandeur, celui-ci y joint:

a) l'étiquette officielle d'un emballage de chaque lot de pommes de terre, lorsqu'il s'agit de pommes de terre vendues en emballage;

b) un exemplaire du permis visé à l'alinéa 56(1)*a*), lorsqu'il s'agit de pommes de terre vendues en vrac; ou

c) un exemplaire de la permission écrite visée à l'alinéa 57(1)*b*), lorsqu'il s'agit de pommes de terre visées à l'article 57.

Conditions visant l'inspection d'une culture

50. (1) Sous réserve du paragraphe (3), l'inspection d'une culture en croissance ne se fait qu'aux conditions suivantes:

a) la culture ne doit être plantée que de pommes de terre de semence qui

(i) sont d'une variété prescrite et

(A) répondent aux exigences des qualités Élite I, Élite II, Élite III ou Fondation, ou

(B) ont été importées d'un État des États-Unis et sont certifiées par un organisme de certification de cet État comme étant d'une qualité qui possède les mêmes normes qu'une qualité visée à la disposition (A), ou

(ii) ont été produites d'une culture en croissance ayant été inspectée par un inspecteur et approuvée par le chef de service comme culture en croissance devant produire des pommes de terre de semence d'une qualité visée à la disposition (i)(A); et

(*b*) the person applying for inspection is able, at the time of inspection, to establish to the satisfaction of an inspector the origin and grade of each lot of seed potatoes planted.

(2) For the purposes of clause (1)(*a*)(i)(B), "certification agency of a state" means an agency authorized by the government of the state to certify seed potatoes.

(3) Inspection shall not be made of a growing crop if

(*a*) the crop is growing in a field where, in the previous year,

(i) table stock potatoes had been planted, or

(ii) potatoes infected with bacterial ring rot were produced or found;

(*b*) the crop is less than 1/2 hectare in area and is not planted wholly in tuber units;

(*c*) as a result of late planting, lack of cultivation, the existence of weeds or leaf injury, an inspector is unable to determine by visual inspection the condition of the crop;

(*d*) the crop is located within 60 metres of another growing crop that has visible symptoms of a virus disease the symptoms of which exceed the limits specified in the table to section 5 of Schedule IV and there is no barrier between the growing crops that, in the opinion of the inspector, would provide adequate protection for the crop;

(*e*) two or more varieties of potatoes are planted in the same field and the distance between the varieties is less than 2 metres;

(*f*) the grower has planted on the farm on which the crop is planted,

(i) Certified grade seed potatoes of a variety that is the same as that of the growing crop, or

(ii) table stock potatoes of any variety;

(*g*) an inspector has reason to believe that the equipment used to plant or cultivate the crop is contaminated by pathogens that are or may be detrimental to the crop; or

(*h*) the crop has been treated with a sprout inhibitor or has been exposed to a sprout inhibitor as a result of drifting from a field other than the field in which the crop was planted.

Field Inspection

51. (1) Where an application is made pursuant to section 49 for inspection of a growing crop, an inspector shall inspect that crop as required by Schedule IV for the grade of potatoes that the crop is intended to produce in order to determine whether the crop meets the growing crop requirements for that grade.

(2) Prior to the first inspection of a growing crop, the producer of the crop shall submit for examination by an

b) la personne demandant l'inspection établit, au moment de l'inspection et à la satisfaction de l'inspecteur, l'origine et la qualité de chaque lot de pommes de terre de semence plantées.

(2) Aux fins de la disposition (1)*a*)(i)(B), «organisme de certification d'un État» désigne un organisme autorisé par le gouvernement de l'État à certifier les pommes de terre de semence.

(3) L'inspection d'une culture en croissance ne peut être faite si

a) la culture se trouve dans un champ où, l'année précédente,

(i) des pommes de terre de consommation ont été plantées, ou

(ii) des pommes de terre infectées par le flétrissement bactérien ont été produites ou trouvées;

b) la superficie de la culture est inférieure à 1/2 hectare et qu'elle n'est pas entièrement plantée de tubercules individualisés;

c) en raison d'une plantation tardive, d'un manque de façons culturales, de la présence de mauvaises herbes ou de feuilles endommagées, l'inspecteur se trouve dans l'impossibilité de déterminer l'état de la culture par inspection visuelle;

d) la culture est située à moins de 60 mètres d'une autre culture en croissance ayant des symptômes visibles d'une virose excédant les limites indiquées au tableau de l'article 5 de l'annexe IV et qu'il n'existe pas d'obstacle entre ces cultures qui, selon l'inspecteur, pourrait servir de protection suffisante pour la culture;

e) deux variétés ou plus de pommes de terre sont plantées dans le même champ et que la distance entre les variétés est inférieure à 2 mètres;

f) le producteur a planté sur la ferme sur laquelle la culture est plantée,

(i) des pommes de terre de semence de qualité Certifiée dont la variété est la même que la culture en croissance, ou

(ii) des pommes de terre de consommation de n'importe quelle variété;

g) l'inspecteur a raison de croire que le matériel utilisé pour planter ou sarcler la culture est contaminé par des agents pathogènes qui nuisent ou pourraient nuire à la culture; ou

h) la culture a été traitée à l'aide d'un inhibiteur de germination ou en a été exposée par suite de la dérive provenant d'un champ autre que celui où se trouve la culture plantée.

Inspection en culture

51. (1) Lorsqu'une demande d'inspection est faite selon l'article 49, la culture en croissance doit être inspectée par un inspecteur selon les exigences de l'annexe IV à l'égard de la qualité de pommes de terre que la culture est destinée à produire pour déterminer si cette dernière répond aux exigences d'une culture en croissance pour cette qualité.

(2) Avant la première inspection d'une culture en croissance, le producteur de ladite culture soumet à l'examen de

inspector the following information in respect of the potatoes planted:

(*a*) the official tags [illegible] of these potatoes, in the case of potatoes packed in containers;

(*b*) a copy of the permit referred to in paragraph 56(1)(*a*) in the case of potatoes sold in bulk; or

(*c*) a copy of the written permission referred to in paragraph 57(1)(*b*), in the case of potatoes referred to in section 57.

Growing Crop Certificate

52. (1) Subject to subsection (2), where an inspector has inspected a growing crop and is satisfied that the crop meets all the requirements set out in Schedule IV for a grade of seed potatoes, he shall issue to the grower a certificate

(*a*) specifying

(i) the grade and variety of the potatoes,

(ii) the number of hectares planted, and

(iii) the certificate numbers; and

(*b*) stating that the crop meets the requirements for the grade.

(2) A certificate shall not be issued in respect of a growing crop where

(*a*) the crop was not top-killed as directed by an inspector;

(*b*) the crop has been treated with a sprout inhibitor or has been exposed to a sprout inhibitor as a result of drifting from a field other than the field in which the crop was planted;

(*c*) any community or custom equipment was used in cutting the seed, or in planting, cultivating or harvesting the growing crop without being disinfected to the satisfaction of an inspector; or

(*d*) in the opinion of an inspector, the crop

(i) has been contaminated with bacterial ring rot, or

(ii) was grown on a farm on which bacterial ring rot was found and the officer in charge is not satisfied that the crop can be harvested and stored in a manner that will prevent contamination by bacterial ring rot.

(3) Notwithstanding subsection (2), where the grower fails to top-kill his growing crop as advised by an inspector but in the opinion of the inspector the crop was not seriously affected by such failure to top-kill and the crop meets the requirements for Certified grade seed potatoes, the inspector may, with the approval of the officer in charge, issue a certificate in respect of that crop.

Official Tags

53. (1) Official tags shall be issued only for seed potatoes that meet the requirements for the grade named on the tag.

(2) Where, at any time, it appears to an inspector that seed potatoes for which official tags were issued pursuant to this section do not meet the requirements for the grade named on

l'inspecteur les renseignements suivants à l'égard des pommes de terre plantées:

a) les étiquettes officielles des emballages de ces pommes de terre, dans le cas de pommes de terre emballées dans des emballages;

b) un exemplaire du permis visé à l'alinéa 56(1)*a*), dans le cas de pommes de terre vendues en vrac; ou

c) un exemplaire de la permission écrite visée à l'alinéa 57(1)*b*), dans le cas de pommes de terre visées à l'article 57.

Certificat de culture en croissance

52. (1) Sous réserve du paragraphe (2), lorsqu'un inspecteur a inspecté une culture en croissance et est satisfait qu'elle répond à toutes les exigences visées à l'annexe IV pour une qualité de pommes de terre de semence, il délivre au producteur un certificat

a) indiquant

(i) la qualité et la variété des pommes de terre,

(ii) le nombre d'hectares plantés, et

(iii) les numéros de certificat; et

b) établissant que la culture répond aux exigences de la qualité.

(2) Un certificat ne peut être délivré à l'égard d'une culture en croissance si

a) la culture n'a pas été défanée selon les directives de l'inspecteur;

b) la culture a été traitée par un inhibiteur de germination ou en a été exposée par suite de la dérive d'un champ autre que celui où se trouve la culture plantée;

c) un matériel collectif ou utilisé par un entrepreneur a servi à trancher les plantons, à la plantation, au sarclage ou à la récolte de la culture en croissance sans avoir été désinfecté à la satisfaction d'un inspecteur; ou

d) si, selon l'inspecteur, la culture

(i) a été contaminée par le flétrissement bactérien, ou

(ii) a été produite sur une exploitation agricole où le flétrissement bactérien a été constaté et que le chef de service ne croit pas que les tubercules puissent être récoltés et entreposés de façon à prévenir la contamination par le flétrissement bactérien.

(3) Nonobstant le paragraphe (2), si le producteur ne défane pas sa culture en croissance à la demande de l'inspecteur mais que de l'avis de ce dernier la culture n'a pas été gravement affectée par cette lacune et que la culture répond aux exigences des pommes de terre de semence de la qualité Certifiée, l'inspecteur peut, avec l'approbation du chef de service, délivrer un certificat pour cette culture.

Étiquettes officielles

53. (1) Les étiquettes officielles ne sont délivrées que pour des pommes de terre de semence qui répondent aux exigences de la qualité indiquée sur l'étiquette.

(2) Un inspecteur peut exiger la remise de ces étiquettes officielles si, à un moment quelconque, il lui semble que les pommes de terre de semence pour lesquelles les étiquettes

the tags, he may require the return of those tags.

Packing and Marking

54. (1) Subject to section 56, seed potatoes shall be packed in containers that,

(*a*) are new and closed after packing; and

(*b*) have no markings that

(i) refer to table stock potatoes, or

(ii) are likely to result in the potatoes being mixed with potatoes other than seed potatoes.

(2) Containers that are packed pursuant to subsection (1) shall have attached thereto an official tag showing

(*a*) the grade, variety and size of the potatoes;

(*b*) the certificate number; and

(*c*) the date the tag was issued.

Repacking

55. Seed potatoes that were packed pursuant to section 54 may be repacked only if the containers are new, and

(*a*) in the case where the containers hold less than 20 kilograms of potatoes,

(i) a permit in writing is obtained from the Director,

(ii) there is attached to the container a tag or label that is provided by the packer and shows

(A) the name and address of the packer,

(B) the grade name, size and variety of the potatoes, and

(C) the certificate number, and

(iii) the person repacking the potatoes returns to an inspector the official tags that were attached to the original containers; or

(*b*) in the case where the containers hold more than 20 kilograms of potatoes,

(i) permission is obtained from an inspector,

(ii) the repacking is supervised by an inspector, and

(iii) the official tags from the containers in which the potatoes were packed pursuant to section 54 are handed to the inspector at the time of repacking.

Sale in Bulk

56. (1) Subject to subsection (3), seed potatoes may be sold in bulk if

(*a*) a permit in writing authorizing the sale is issued by an inspector and two copies of the permit accompany the potatoes when they are shipped; and

(*b*) the potatoes were produced by a growing crop for which a certificate was issued.

(2) No permit shall be issued by an inspector pursuant to subsection (1) in respect of any potatoes unless the equipment to be used in shipping them has been disinfected to his satisfaction.

officielles ont été délivrées, en vertu de cet article, ne répondent pas aux exigences de la qualité indiquée sur ces étiquettes.

Emballage et marquage

54. (1) Sous réserve de l'article 56, les pommes de terre de semence doivent être emballées dans des emballages qui

a) sont neufs et fermés après l'emballage;

b) n'ont pas de marques

(i) se rapportant aux pommes de terre de consommation, ou

(ii) susceptibles de les confondre avec des pommes de terre autres que des pommes de terre de semence.

(2) Les emballages conformes au paragraphe (1) doivent porter une étiquette officielle indiquant

a) la qualité, la variété et le calibre des pommes de terre;

b) le numéro de certificat; et

c) la date à laquelle l'étiquette a été délivrée.

Remballage

55. Les pommes de terre de semence emballées selon l'article 54 peuvent être remballées seulement si les emballages sont neufs, et

a) dans le cas d'emballages de moins de 20 kilogrammes de pommes de terre,

(i) un permis écrit est obtenu du directeur,

(ii) une étiquette mobile ou fixe fournie par l'emballeur est fixée à l'emballage et il y figure

(A) le nom et l'adresse de l'emballeur,

(B) le nom de qualité, le calibre et la variété des pommes de terre, et

(C) le numéro de certificat, et

(iii) la personne remballant les pommes de terre retourne à un inspecteur les étiquettes officielles qui étaient fixées aux emballages originaux; ou

b) dans le cas d'emballages de plus de 20 kilogrammes de pommes de terre,

(i) la permission en est obtenue d'un inspecteur,

(ii) le remballage est surveillé par un inspecteur, et

(iii) les étiquettes officielles des emballages dans lesquels les pommes de terre ont été emballées selon l'article 54 sont remises à l'inspecteur au moment du remballage.

Vente en vrac

56. (1) Sous réserve du paragraphe (3), les pommes de terre de semence peuvent être vendues en vrac si

a) un permis par écrit en autorisant la vente est délivré par un inspecteur et deux copies dudit permis accompagnent les pommes de terre lorsqu'elles sont expédiées; et

b) les pommes de terre ont été produites dans une culture en croissance pour laquelle un certificat a été délivré.

(2) Nul permis n'est délivré par un inspecteur selon le paragraphe (1) à l'égard de toutes pommes de terre à moins que le matériel qui sera utilisé pour les expédier n'ait été désinfecté à sa satisfaction.

(3) No person shall resell in bulk under any grade name any seed potatoes that were previously sold in bulk.

(4) Seed potatoes that are sold in bulk for the purpose of packaging and resale are not required to be sorted as to size or to conform to the standards set out in Schedule VI at the time of such sale, if authority for the sale is obtained from the officer in charge.

(5) No person shall resell any seed potatoes referred to in subsection (4) unless at the time of the resale they are sorted as to size and conform to the standards set out in Schedule VI.

Tuber Damage

57. (1) Seed potatoes that are graded Elite I, Elite II, Elite III or Foundation but have tuber damage in excess of that permitted by the standards set out in Schedule VI in respect of those grades may be sold as seed potatoes only if

(*a*) the equipment used to transport the potatoes has been disinfected to the satisfaction of an inspector; and

(*b*) an inspector has given written permission for the sale of the potatoes and two copies of the permission are available for examination.

(2) No person shall resell any seed potatoes that have been sold pursuant to subsection (1).

Potato Eyes and Setts

58. (1) Potato eyes and setts may be sold as seed potatoes only if

(*a*) they are cut from seed potatoes of a grade named in Schedule IV;

(*b*) they conform to the standards set out in Schedule VII; and

(*c*) the person who performed the cutting was authorized to do so by a permit in writing from the Director.

(2) Every container of potato eyes or setts shall have attached thereto a tag or label provided by the packer showing

(*a*) the name and address of the packer;

(*b*) the grade name and variety of the potatoes from which they were cut; and

(*c*) the certificate number.

Importation

59. (1) Seed potatoes of any variety that has been prescribed by the Minister pursuant to paragraph 4(2)(*a*) of the Act may be imported into Canada from a state of the United States only if

(*a*) they have been duly certified and packed in accordance with the regulatory requirements of the government of that state; and

(*b*) the state is recognized by the Minister as having regulatory requirements substantially similar to these Regulations.

(2) Seed potatoes of a variety that has not been prescribed by the Minister pursuant to paragraph 4(2)(*a*) of the Act may

(3) Nul ne revend sous un nom de qualité des pommes de terre de semence antérieurement vendues en vrac.

(4) Les pommes de terre de semence vendues en vrac avec l'autorité du chef de service à des fins de remballage et de revente n'ont pas à être triées, au moment de ladite vente, selon le calibre ni à être conformes aux normes visées à l'annexe VI.

(5) Nul ne revend les pommes de terre de semence visées au paragraphe (4) à moins que, au moment de la revente, elles ne soient triées selon le calibre et qu'elles ne soient conformes aux normes visées à l'annexe VI.

Dommages aux tubercules

57. (1) Les pommes de terre de semence classées Élite I, Élite II, Élite III ou Fondation mais comptant des tubercules endommagés au-delà des tolérances autorisées par les normes visées à l'annexe III pour ces qualités peuvent être vendues comme pommes de terre de semence si

a) le matériel utilisé pour transport des pommes de terre a été désinfecté à la satisfaction d'un inspecteur; et

b) un inspecteur a donné une permission écrite pour la vente des pommes de terre et que deux copies de la permission sont disponibles pour examen.

(2) Nul ne revend des pommes de terre de semence qui ont été vendues selon le paragraphe (1).

Yeux et fragments de pommes de terre

58. (1) Les yeux et fragments de pommes de terre peuvent être vendus comme pommes de terre de semence seulement

a) s'ils proviennent de pommes de terre de semence d'une qualité désignée à l'annexe IV;

b) s'ils sont conformes aux normes visées à l'annexe VII; et

c) si la personne qui les a coupés était autorisée en vertu d'un permis écrit du directeur.

(2) Chaque emballage d'yeux ou de fragments de pommes de terre doit porter une étiquette mobile ou fixe fournie par l'emballeur et indiquant

a) le nom et l'adresse de l'emballeur;

b) le nom de qualité et d'où ils proviennent; et

c) le numéro de certificat.

Importation

59. (1) Les pommes de terre de semence de toute variété prescrite par le Ministre selon l'alinéa 4(2)*a*) de la Loi peuvent être importées au Canada en provenance d'un État des États-Unis seulement si

a) elles ont été dûment certifiées et emballées selon les exigences réglementaires du gouvernement de cet État; et

b) l'État est reconnu par le Ministre comme ayant des exigences réglementaires essentiellement semblables à celles du présent règlement.

(2) Les pommes de terre de semence d'une variété qui n'a pas été prescrite par le Ministre selon l'alinéa 4(2)*a*) de la Loi

is imported into Canada from the United States for the purposes of research or seeding by the importer under authority in writing from the Director.

Detention

60. (1) Where seed potatoes, seized by an inspector pursuant to section 7 of the Act, are detained, the inspector shall

(*a*) attach to

(i) at least one of the containers, where the potatoes are in containers; or

(ii) the place where they are located, where the potatoes are in bulk,

a tag, hereinafter referred to as a detention tag; and

(*b*) deliver or mail to the owner or person in possession of the potatoes, a notice in writing of the detention setting out a description of the potatoes and the place where they are being detained.

(2) Every detention tag shall set out a description of the seed potatoes seized and the date and place of the seizure and shall be signed by an inspector.

(3) Except with the written authority of an inspector, no person shall remove seed potatoes from the place where they are detained pursuant to subsection (1).

(4) Where seed potatoes are detained, they shall be detained at the risk and expense of the owner.

(5) Except as authorized by an inspector, no person shall alter or remove a detention tag attached to a container or a bulk shipment of seed potatoes.

Forfeiture

61. Seed potatoes forfeited pursuant to section 7 of the Act shall be disposed of in such manner as the officer in charge may direct.

peuvent être importées des États-Unis au Canada aux fins de recherches ou d'ensemencement par l'importateur avec l'autorisation écrite du directeur.

Rétention

60. (1) Lorsque des pommes de terre de semence, saisies par un inspecteur selon l'article 7 de la Loi, sont retenues, l'inspecteur

a) appose

(i) sur au moins un des emballages, si les pommes de terre sont dans des emballages, ou

(ii) à l'endroit où elles sont gardées, si les pommes de terre sont en vrac,

une étiquette ci-après appelée étiquette de rétention; et

b) envoie par la poste au propriétaire ou à la personne qui est en possession des pommes de terre, un avis par écrit de la rétention contenant une description des pommes de terre et indiquant l'endroit où elles sont retenues.

(2) Chaque étiquette de rétention doit porter une description des pommes de terre de semence saisies et la date et l'endroit de la saisie, et doit être signée par un inspecteur.

(3) Sauf autorisation écrite d'un inspecteur, nul ne déplace les pommes de terre de semence de l'endroit où elles sont retenues selon le paragraphe (1).

(4) Lorsque des pommes de terre de semence sont retenues, elles sont détenues aux risques et dépens du propriétaire.

(5) Sauf autorisation d'un inspecteur, nul n'altère ou n'enlève une étiquette de rétention apposée à un emballage ou à une expédition en vrac de pommes de terre de semence.

Confiscation

61. Les pommes de terre de semence confisquées selon l'article 7 de la Loi doivent être aliénées de la manière que peut prescrire le chef de service.

SCHEDULE IV

(ss. 45, 47, 50, 51, 52 and 58)

GRADES OF SEED POTATOES

Elite I

1. Elite I seed potatoes shall be

(*a*) grown from virus-tested cuttings or from plants, tubers or clones selected by an inspector and determined

(i) by microscopic examination or other laboratory method approved by the Minister, to be free from bacterial ring rot pathogen (*Corynebacterium sepedonicum*),

(ii) by eye indexing, to be free from all visible symptoms of viruses, or

(iii) by serological, plant indicator host or other method of testing approved by the Minister, to be free from all viruses;

(*b*) grown in identifiable tuber units; and

(*c*) inspected three times while growing and on each inspection determined to be free from viruses and other diseases that may be discovered by visual inspection.

Elite II

2. Elite II seed potatoes shall be

(*a*) grown from Elite I seed potatoes;

(*b*) grown in identifiable tuber units;

(*c*) inspected at least three times while growing and on the third inspection determined by an inspector to be free from visible symptoms of diseases.

Elite III

3. (1) Elite III seed potatoes shall be grown from Elite I or Elite II seed potatoes and meet the requirements set out in subsections (2), (3) and (4).

(2) At least 10 per cent of each variety of the seed potatoes planted shall be planted in tuber units.

(3) The potatoes shall be inspected three times while growing and the percentage of plants showing varietal mixture or symptoms of disease as specified in Column I of the tables to this section on the first, second and third inspection shall not exceed that set out

(*a*) in the case of seed potatoes planted in tuber units, in Column II, III or IV of Table I, and

(*b*) in the case of seed potatoes planted otherwise than in tuber units, in Column II, III or IV of Table II,

TABLE I

Item	Column I Disease and Varietal Mixture	Column II Percentage on First Inspection	Column III Percentage on Second Inspection	Column IV Percentage on Third Inspection
1.	Potato spindle tuber	nil	nil	nil
2.	Potato witch's broom	nil	nil	nil
3.	Bacterial ring rot	nil	nil	nil
4.	Blackleg	0.25	0.1	0.1
5.	Wilts	0.25	0.1	0.1
6.	Total, all viruses	0.25	0.1	0.1
7.	Total, blackleg, wilts and viruses	0.5	0.25	0.25
8.	Varietal mixture	0.25	nil	nil

TABLE II

Item	Column I Disease and Varietal Mixture	Column II Percentage on First Inspection	Column III Percentage on Second Inspection	Column IV Percentage on Third Inspection
1	Potato spindle tuber	nil	nil	nil
2	Potato witch's broom	nil	nil	nil
3	Bacterial ring rot	nil	nil	nil
4	Total viruses	0.25	0.1	0.1
5	Total Wilts, blackleg and viruses	0.5	0.25	0.25
6	Varietal mixture	0.1	nil	nil

Foundation

4. (1) Foundation seed potatoes shall be grown from Elite I, Elite II or Elite III seed potatoes and meet the requirements set out in subsection (4).

(2) Notwithstanding subsection (1), Foundation seed potatoes may be grown from seed potatoes produced in the seed plot of the grower if

(*a*) there has, in the preceding three years, been no bacterial ring rot on the farm of the grower;

(*b*) the seed plot was planted with Elite I, Elite II, Elite III or equivalent seed in tuber units;

(*c*) the potatoes were inspected three time while growing and each time met the growing crop requirements for Elite III; and

(*d*) approval in writing is received from the officer in charge.

(3) A seed plot referred to in subsection (2) may be planted with equivalent seed referred to in paragraph (2)(*b*) only if the seed was tested for bacterial ring rot within the five-year period immediately preceding the time of planting.

(4) The potatoes referred to in subsection (1) shall be inspected two times while growing and each time the percentage of plants showing symptoms of disease or varietal mixture as specified in Column I of the table to this section shall not exceed that set out in Column II or III of the table, whichever is appropriate.

TABLE

Item	Column I Disease and Varietal Mixture	Column II Percentage on First Inspection	Column III Percentage on Second Inspection
1.	Potato spindle tuber	nil	nil
2.	Potato witch's broom	nil	nil
3.	Bacterial ring rot	nil	nil
4.	Total viruses	0.25	0.1
5.	Total wilts, blackleg and viruses	0.5	0.25
6.	Varietal mixture	0.1	nil

Certified

5. (1) Certified seed potatoes shall be grown from Elite I, Elite II, Elite III or Foundation seed potatoes and meet the requirements set out in subsections (2) and (3).

(2) The potatoes shall be inspected two times during the growing season.

(3) The percentage of plants showing varietal mixture or symptoms of disease as specified in Column I of the table to this section on the first and second inspection shall not exceed that set out in Column II or III of the table, whichever is appropriate.

TABLE

Item	Column I Disease and Varietal Mixture	Column II Percentage on First Inspection	Column III Percentage on Second Inspection
1.	Potato spindle tuber	nil	nil
2.	Potato witch's broom	nil	nil
3.	Bacterial ring rot	nil	nil
4.	Any one virus	1.0	0.5
5.	Total viruses	2.0	1.0
6.	Total wilts, blackleg and viruses	3.0	2.0
7.	Varietal mixture	1.0	0.1

SCHEDULE V

(s. 47)

TUBER SIZES

1. (1) Subject to subsection (2), seed potato tubers shall be sorted according to size as follows:

(*a*) Size A, where not more than five per cent by mass of the tubers in the lot being sorted weigh less than 113 grams or more than 340 grams, except in the case of long varieties such as Netted Gem and White Rose where the maximum mass is 454 grams; and

(*b*) Size B, where not more than three per cent by mass of the tubers in the lot being sorted weigh less than 42 grams or more than 113 grams.

2. Where the purchaser of a lot of seed potatoes has specified a size of seed potatoes other than a size described in subsection (1), the tubers may be sorted according to the size so specified.

SCHEDULE VII

(s. 58)

STANDARDS FOR POTATO EYES AND CUT SETTS

1. All potato eyes and setts shall

(*a*) have an average mass of not less than 14 grams at the time they are cut; and

(*b*) be firm and free from visible damage from bacteria, fungi or insects.

2. At least 95 per cent of the potato eyes or setts in any container thereof shall have a depth of 19 millimetres or more.

SCHEDULE VI

(ss. 48, 56 and 57)

STANDARDS FOR TUBERS

1. In any lot of seed potato tubers the percentage showing symptoms of any disease or defect specified in Column I of the table to this section shall not exceed that set out in Column II of the table.

TABLE

Column I Disease or Defect	Column II Percentage
1. Soft rot or wet breakdown	0.1
2. Dry rot including late blight	1.0
3. Scab and Rhizoctonia	
a) slight	10.0
b) moderate	5.0
4. Stem end discolouration due to top-killing, frost, heat or drought with penetration from 6 millimetres to 13 millimetres	4.0

2. No tuber in any lot of seed potatoes shall show symptoms of bacterial ring rot.

3. The percentage of tubers in a lot of seed potatoes of any grade showing symptoms of viruses including leaf roll necrosis shall not exceed the percentage permitted by Schedule IV for all viruses for that grade.

4. The percentage of tubers in a lot of seed potatoes of any grade that are of a variety foreign to the variety of which the lot generally consists shall not exceed the percentage permitted by Schedule IV for that grade.

5. The number of malformed or externally damaged tubers in any lot of seed potatoes shall not exceed two per cent of the number in the lot.

6. The number of tubers in the aggregate affected by diseases and defects, not including slight scab, slight rhizoctonia and stem-end discolouration shall not exceed five per cent of the total number of tubers in any lot of seed potatoes.

7. All tubers except two per cent in any lot of seed potatoes shall be firm and well shaped.

APPENDIX B

COST AND RETURNS FOR POTATO PRODUCTION - ALBERTA (1980 AND 1981)

TABLE A-7
COSTS AND RETURNS FOR POTATO PRODUCTION - ALBERTA

A. INCOME	SEED	TABLE
Acreage	77.88	102.20
Yield Per Acre	12.00	12.35
Crop Value	1756.50	1737.77
Miscellaneous Receipts	2.80	1.53
TOTAL RECEIPTS PER ACRE	1759.30	1739.30
B. OPERATING COSTS		
Fertilizer	78.59	49.03
Chemicals	23.82	28.82
Seed Purchased	110.30	67.22
Home Grown Seed	---	19.02
Custom Work Hired	40.55	36.91
Crop and Hail Insurance	10.98	.40
Cash Rent and Crop Share	---	22.11
Power Machinery - Fuel	39.72	48.15
Power Machinery - Repairs	39.70	61.92
General Machinery - Repairs	54.99	1.56
Special Machinery - Repairs	16.45	4.40
Miscellaneous Equipment	2.33	.38
Building Repairs	14.23	2.55
Operating Capital Interest Paid	50.74	26.34
Utilities	120.46	11.69
Other Insurance	23.55	3.77
Property Taxes	7.48	6.25
Accounting and Legal	5.18	.81
Other	68.87	104.83
Hired Labor	149.86	224.28
Tools Purchased	2.97	.66
Depreciation - Improvements	54.55	13.25
Depreciation - Machinery	149.32	75.34
TOTAL OPERATING COSTS	964.46	829.68
C. PRODUCTION COSTS		
Interest on Equity - Owned Land	76.96	69.04
Interest on Equity - Improvements	88.86	19.75
Interest on Equity - Machinery	109.55	39.17
Interest on Long Term Debt	76.98	23.10
Operators Labor	45.59	65.88
Family Labor	15.14	16.26
TOTAL PRODUCTION COSTS	1377.54	1062.89

Source:ADA, Economics of Potato and Vegetable Production in Alberta, Agdex 821-15, Edmorton, 1980.

TABLE 11 COSTS AND RETURNS FOR POTATO PRODUCTION

		GROUP AVERAGE (9 REPORTS)	YOUR FARM
PART I - INCOME			
Acreage Per Farm		182.87	
Yield Per Acre (tonnes)		10.58	
Crop Value		$1106.14	
Crop Insurance Receipts			
Miscellaneous Receipts		$0.65	
TOTAL RECEIPTS $/ACRE	$104.64/t	$1106.79	
PART II - OPERATING COSTS	------ DOLLARS PER ACRE ------		
Fertilizer		73.79	
Chemicals		29.19	
Seed Purchased		98.97	
Home Grown Seed		6.12	
Custom Work Hired		11.04	
Crop and Hail Insurance		0.27	
Cash Rent and Crop Share		27.49	
Power Machinery - Fuel		49.49	
Power Machinery - Repairs		24.91	
General Machinery - Repairs		30.66	
Special Machinery - Repairs		13.67	
Miscellanous Equipment		8.48	
Building Repairs		1.24	
Operating Capital Interest Pd.		60.78	
Utilities		18.52	
Other Insurance		8.96	
Property Taxes		11.51	
Accounting and Legal		3.90	
Other		58.44	
Hired Labour		227.25	
Tools Purchased		3.59	
Depreciation - Improvements		7.24	
Depreciation - Machinery		94.43	
TOTAL OPERATING COSTS	82.25/t	869.95	
PART III - PRODUCTION COSTS			
Operating Costs		869.95	
Int. on Equity - Owned Land		120.28	
Int. on Equity - Improvements		30.41	
Int. on Equity - Machinery		62.89	
Int. on Equity - Supplies			
Interest on Long Term Debt		56.00	
Operator's Labour		38.96	
Family Labour		9.91	
TOTAL PRODUCTION COSTS	112.35/t	1188.42	
PART IV - MANAGEMENT FACTORS			
Return Over Operating Costs	22.39/t	236.84	
Return to Management	-7.72/t	-81.63	
Labour Used (Hours)	4.22/t	44.66	
PART V - INVESTMENT ITEMS			
Supply Inventory		502.44	
Power Machinery		473.75	
Other Machinery		778.22	
Buildings and Improvements		382.81	
Land		1345.63	
TOTAL INVESTMENT		3482.85	

TABLE 12

COSTS AND RETURNS FOR SEED POTATO PRODUCTION

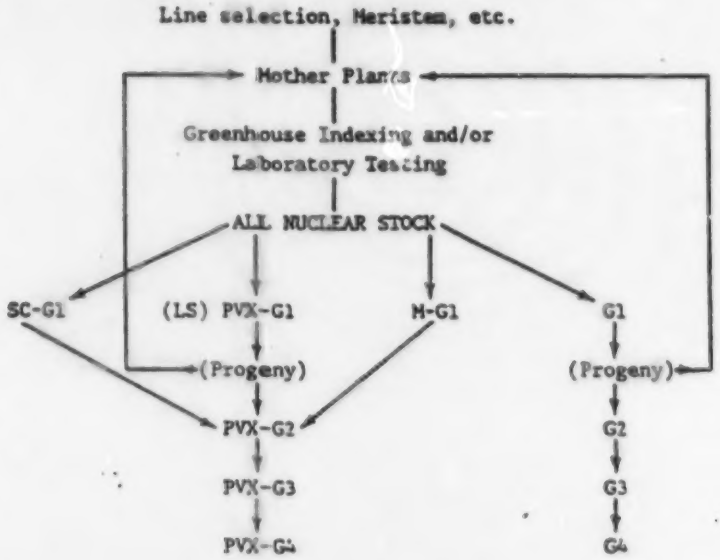
		GROUP AVERAGE (3 REPORTS)	YOUR FARM
PART I - INCOME			
Acreage Per Farm		80.25	
Yield Per Acre (tonnes)		8.81	
Crop Value		$1410.18	
Crop Insurance Receipts		$103.84	
Miscellaneous Receipts			
TOTAL RECEIPTS $/ACRE	$171.81/t	$1514.02	
PART II - OPERATING COSTS	- - - - - - DOLLARS PER ACRE - - - - - -		
Fertilizer		95.22	
Chemicals		30.28	
Seed Purchased		101.14	
Home Grown Seed			
Custom Work Hired		1.91	
Crop and Hail Insurance		21.28	
Cash Rent and Crop Share		12.46	
Power Machinery - Fuel		53.19	
Power Machinery - Repairs		41.30	
General Machinery - Repairs		77.00	
Special Machinery - Repairs		33.23	
Miscellanous Equipment		0.19	
Building Repairs		10.32	
Operating Capital Interest Pd.		110.80	
Utilities		30.71	
Other Insurance		37.13	
Property Taxes		8.02	
Accounting and Legal		7.75	
Other		14.82	
Hired Labour		217.13	
Tools Purchased		3.22	
Depreciation - Improvements		48.07	
Depreciation - Machinery		158.33	
TOTAL OPERATING COSTS	126.36/t	1113.50	
PART III - PRODUCTION COSTS			
Operating Costs		1113.50	
Int. on Equity - Owned Land		91.11	
Int. on Equity - Improvements		84.16	
Int. on Equity - Machinery		74.04	
Int. on Equity - Supplies			
Interest on Long Term Debt		20.23	
Operator's Labour		25.73	
Family Labour		16.61	
TOTAL PRODUCTION COSTS	161.75/t	1425.39	
PART IV - MANAGEMENT FACTORS			
Return Over Operating Costs	45.45/t	400.51	
Return to Management	10.06/t	88.63	
Labour Used (Hours)	2.35/t	20.66	
PART V - INVESTMENT ITEMS			
Supply Inventory		1014.52	
Power Machinery		762.99	
Other Machinery		1128.82	
Buildings and Improvements		1256.74	
Land		1072.03	
TOTAL INVESTMENT		5235.10	

APPENDIX C

MONTANA SEED POTATO PROGRAM

OUTLINE OF REQUIRED STEPS IN MONTANA'S SEED POTATO PROGRAM

(See 1986 Rules and Regulations for full details)*



Note: G = Generation; PVX = Potato Virus X tested; SC = Stem-cut
M = Meristem; LS = Line Select

The potato seed program in Montana is one of limited generations. Hills, clones and clone increase are all steps in the development of the seed stocks (see above). All Nuclear stock must be pretested for diseases in the greenhouse and/or in the laboratory. Generation 1 is the progeny of Nuclear stock. Generation 2 is the progeny of Generation 1, and so on. Generation 4 is not eligible for recertification. Each generation must pass field inspections (Table 2) and PVX testing in the case of PVX tested, stem-cut and meristem seed (Table 1).

Line selection (LS) is becoming a common practice among Montana seed growers. It is done by planting selected clones in the field and comparing their yields and performances. The best line is then used as a source for Nuclear or Meristem.

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*Copies of 1986 Rules and Regulations can be obtained upon request by writing to Dr. Mike Sun, Potato Laboratory, Montana State University, Bozeman, MT 59717.

STARKEL FARMS

Roger and Ed Starkel
Ronan, Montana

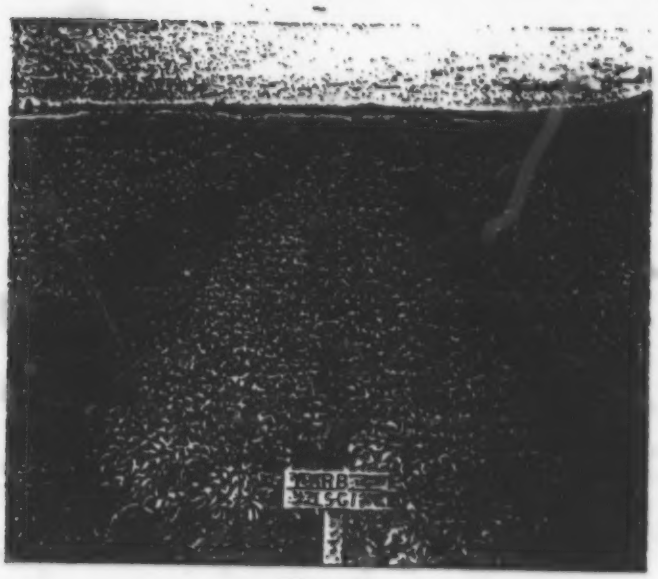
Innovations in Seed Potato Production

Starkel Farms
4284 N. Foothills Drive
Ronan, MT 59864

U. S. POSTAGE
PAID
Permit No. 2
Pablo, MT 59855

Starkel Farms is located at the base of the Mission Mountains in Northwestern Montana. The climatic conditions in the Mission Valley have proven to be excellent for seed potato production.

Our entire program, from greenhouse-grown nuclear stock through G-III seed, is carried out on the farm. This provides 100% control over all aspects of our seed potato production.



(Figure 1)

Our program is based on both line selection and tissue culture. We believe line selecting is the most important phase of our operation. In a tissue culture program, a clone can be increased so rapidly that you must make sure the clone is genetically pure. We achieve this through several years of careful line selecting (Figure 1).

Line selecting allows us to clone plants that have proven to produce exceptionally high yields and consistent tuber uniformity. This is a yearly procedure looking for possible improvements over our current line.

Ten tubers are brought into our lab from our final selection. An eye from each tuber is planted in sterilized soil and placed in our growth chamber. When the plants reach five-to-six inches in height, we increase the heat to 100°F for six weeks. At this high temperature, virus particles and bacteria are immobilized but the plant itself will continue to grow. Therefore, the new growth, which is the meristematic tissue, should be virus-and bacteria-free.

The new growth, containing the meristematic tissue, is dissected using a microscope until the meristem is exposed (Figure 2). The meristem, which is about the size of a single grain of salt, is removed and placed in a tissue culture jar containing liquid nutrient media (Figure 3).

(Figure 2)

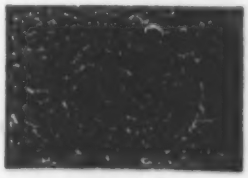
(Figure 3)

(Figure 4)

It remains in the solution until grows into a plantlet and is then transferred into a larger jar containing solid media (Figure 4).

A sample of the plantlets is sent to the Montana Potato Improvement Association to be screened for viruses using both the Elisa Technique and an electron microscope. The plantlets are also tested for bacterial diseases and for spindle tuber viroid. If the testing indicates the plantlets are clean, we are ready to begin rapid multiplication.

Every three to four weeks the plantlets are cut into nodal segments containing one leaf and a fourth-inch of stem. Petri dishes are used instead of jars for the final cutting (Figure 5). Twenty to thirty segments are placed in each dish. The use of petri dishes allows us to grow approximately 15,000 plantlets on a single 3' x 8' shelf in our growth chamber (Figure 6).



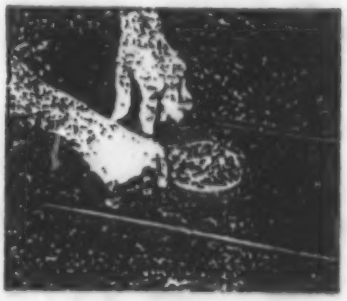
(Figure 5)

(Figure 6)

This process is continued until a final cutting results in the number of plantlets needed to fill the greenhouse.

(Figure 7)

Our greenhouse is 35' x 96' and holds 25,000 plants (Figure 7).

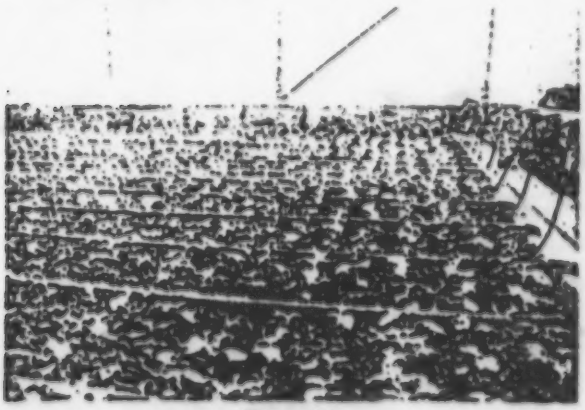


The planting is done entirely by hand from the petri dishes directly into the soil (Figure 8).

(Figure 8)

These plants are grown to maturity in the greenhouse. The harvested seed represents our nuclear stock.

Growing our nuclear stock in the greenhouse environment allows us to control many factors important in this initial stage (Figure 9).



(Figure 9)

FACTORS CONTROLLED WITH A GREENHOUSE

1. Sterilized Soil

Heat-sterilized soil is used to eliminate soil-borne diseases.

2. Irrigation

A drip irrigation system eliminates fungal growth that can occur with overhead watering.

3. Fertilization

Nutrients are applied through the irrigation system according to weekly petiole samples.

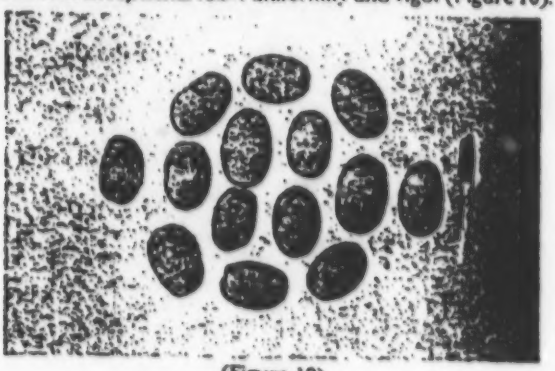
4. Insect Control

All incoming air is filtered to control insects. Smoke bomb insecticides are implemented every other week as an additional control.

5. Isolation

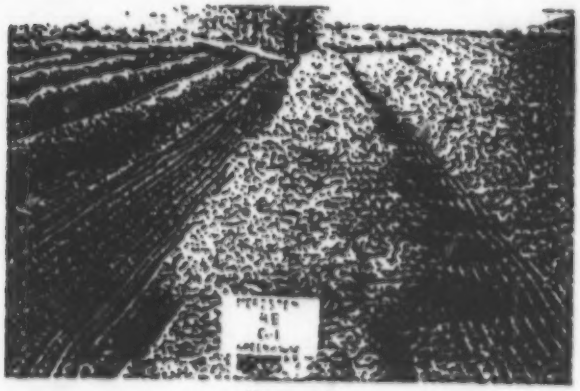
As compared to field-grown seed, access to the greenhouse is strictly controlled and regulated. Potential contamination from animals, insects, and the elements is eliminated.

The control possible in the greenhouse environment results in exceptional tuber uniformity and vigor (Figure 10).



(Figure 10)

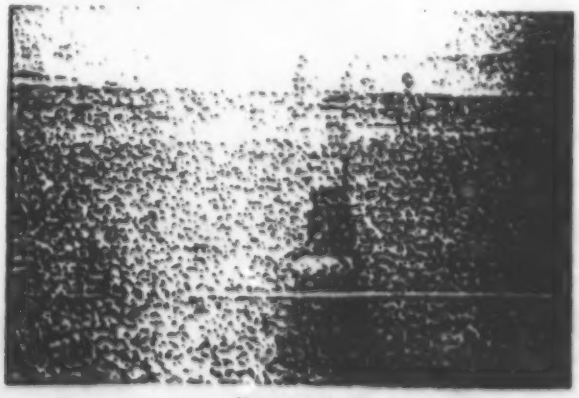
This uniformity and vigor carries out into our G-I seed plot (Figure 11) providing high-quality seed for our G-II and G-III fields.



(Figure 11)

The seed from the greenhouse is planted as single drops to eliminate the contamination possible in the cutting process. The seed plot is planted with wide rows to allow for ground application of insecticides and for careful observation of the plants.

The time, care, and control administered throughout our seed production program are evident in our G-II and G-III fields (Figure 12).



(Figure 12)

At Starkel Farms, we use the latest technology and th best cultural practices to provide the highest quality of see available. Our entire program is dedicated to producing th high-quality seed.

STARKEL FARMS FEATURES:

1. On-farm laboratory and greenhouse facility
2. Separate seed storage for G-I, G-II, and G-III seed
3. New air systems
4. Strict sanitation practices
5. Virgin ground or ten-year rotation used for G-I and C fields
6. Five-year rotation for G-III fields

Starkel Farms is a family operation. We raise appro imately 120 acres of seed potatoes each year. Our s allows us to have 100% control over all aspects of our se production program.

Please feel free to visit the farm at any time of the year look over our operation. If we can assist you with tra plans don't hesitate to contact us.

We are currently accepting orders for Russet Burbank II and G-III seed and Norgold G-II seed.

Call or write:

Starkel Farms
4284 N. Foothills Drive
Ronan, MT 59864
(406) 675-8231 - Roger
(406) 675-8288 - Ed

APPENDIX D

TERMS OF REFERENCE

Project Objective

To identify seed potato market potential in the Pacific Northwest United States - import/export barriers, such as phytosanitary requirements; those conditions required to penetrate the market; back haul routes and capacity; market research and production organization; seed potato varieties for export; preferred production areas. Access Alberta experience including their costing analysis. Library search of production.

Project Activity

1. Access Alberta experience of export seed potatoes including a costing analysis.

2. Identify production areas with the Pacific Northwest of the USA that grow varieties which can be grown in Saskatchewan.

3. Identify potential research facilities within production areas where trails could be conducted.

4. Identify preferred production areas within the Pacific Northwest with considerations to:

   (i) highest yield areas;

   (ii) preferred back-haul routes and capacity.

5. Identifying market, research and production organizations within PNW region.

APPENDIX D (cont'd)

6. Conduct library search of production within PNW region including current seed sources.

7. Identify any trade barriers.

8. Identify packaging requirements.

9. Indicate conditions necessary to penetrate this market.